

Summer School of Aeronautical Engineering

The Aeronautical Engineering summer school is focused on presenting some of the most interesting aspects of research in the aviation domain. During summer school, participants will gain some basic knowledge about aerodynamics, UAVs, materials, and additive manufacturing. The lectures and laboratories will be led by our best staff and use the most advanced infrastructure and facilities. If you apply, you will get experience in:

1. UAV

- selected aspects of Unmanned Aerial Vehicles (UAV) design and usage.
- Aerodynamics, structures, mass distribution, flight stability, and technology affect each other and influence the final design; numerical tools are used to optimize the UAV's effectiveness.

2. Aerodynamics and Aeroacoustics

- Identification of aerodynamics and aeroacoustics problems concerning modern aviation.
- Acoustic interactions, which include effects on the
- generation and propagation of sound and computational applications in aerodynamics and aeroacoustics.
- Sources of aircraft noise and computational aeroacoustics (CAA):
- Noise sources modelling and numerical approaches for sound propagation will be discussed.

3. Additive manufacturing and Materials

- basics of 3D printing.
- The design of 3D printing will be discussed, including popular techniques such as FDM, SLA, and DMLS/SLS.
- 3D printers, design and print sample parts or specimens, which will then be tested for mechanical characteristics.
- **Aircraft design**, the aircraft design process, and their work environment.
- Problems of the aeronautical and space environment, phases, and challenges of the design process.
- The aircraft's main components' requirements, design, and functions will be discussed.
- Using numerical tools in applications

4. Mechanics of flight

- Theoretical, numerical, and semi-empirical methods for applied aerodynamics and flight performance analysis
- , basics of flying vehicles dynamics, problems of static and dynamic stability, and control of aircraft and helicopters.
- Aerobatic maneuvers and high angles of attack, aerodynamics, and dynamics

Laboratories

Part of the laboratories will be held at the Aviation Research Center in Przasnysz near Warsaw (3 days), and some laboratories will be held at the Faculty infrastructure. Students will be transported to ARC facilities for three days and then to Warsaw.

Aviation Center

- **UAV**
Basic knowledge and getting acquainted with various platforms (quadcopters, planes, own constructions, DJI), data acquisition, and fundamental analysis (RGB, thermal, multispectral). Students will see how the construction of the UAV may affect the data collection and will gain some experience in various sensors and onboard devices applications.
- **Additive manufacturing**
Students will be introduced to the basics of operating 3D printers during the hands-on part. This part will include work safety, basic operation, and maintenance activities. As part of the workshop, students will design and print sample parts or specimens, which will then be tested for mechanical characteristics.
- **Gliders**
Each student could take a flight with an instructor in gliders! But before that, students will learn how to prepare the glider for flight, safety issues, and regulations!

Faculty

- **Materials**
During the practical part, students will be acquainted with modern measurement methods used in materials and structural strength research. As part of the workshop, students will perform strength tests of specially prepared samples containing notches made of materials with different elastic-plastic properties. Deformations will be recorded using the Digital Image Correlation (DIC) system during the destruction process. The aim will be to show the effect of notches on the deterioration process of the samples.
- **Aerodynamics:**
The application of computational fluid dynamics (CFD) in laminar boundary layer instability flow regime is typical for low and moderate Reynolds numbers. The application of computational fluid dynamics (CFD) in laminar boundary layer instability flow regime is typical for low and moderate Reynolds numbers.
- **Flight Simulator**
Each student could take a flight with an instructor in a real flight simulator of the Boeing 737 Max! Students will also gain some experience in a helicopter flight simulator.

Additional events

During summer school, a grill/welcome event will be held at the Aviation Research Center in Przasnysz! A Polish day event will be organized in the middle of the week, during which participants can try classic Polish food and drinks! Participants participating in a blended-learning summer school will receive a scholarship to reimburse travel, accommodation, and food costs. The scholarship is ~1000 euros.

The key dates – registration and recruitment process will start on July 15th and end on August 15th.

www.spinakersummerschools.edition1.pw.edu.pl

**SPINAKEE -
International Summer School - Aerospace Engineering**

Schedule for 2025 edition

	mon	tue	wed	thu	fri	sat	sun	mon	tue	wed	thu	fri
	15-Sep	16-Sep	17-Sep	18-Sep	19-Sep	20-Sep	21-Sep	22-Sep	23-Sep	24-Sep	25-Sep	26-Sep
	Online lectures							Warsaw Univ	OBLot - airfield		Warsaw Univ	Warsaw Univ
	Lecture_1	Lecture_2	Lecture_3	Lecture_4	Lecture_5			Practice_1	Practice_2	Practice_3	Practice_4	Practice_5
no. Hours	6	6	6	6	6			6	6	6	6	6
8.15-09.00									Transfer to Przasnysz			
9.15-10.00												
10.15-11.00												
11.15-12.00	Invitation	Lecture 2	Lecture 3	Lecture 4	Lecture 5			Laboratories 1	Laboratories 2	Laboratories 3	Laboratories 4	Laboratories 5
12.15-13.00		Aerodynamics/Aeroacoustics	Construction	Avionics Systems	Aircraft Design			Flight simulator	UAVs/Glider	UAVs/Glider	3D printing	Aerodynamics/Aeroacoustics
13.15-14.00	Lecture 1											
14.15-15.00	Mechanics of flight											
15.15-16.00												
16.15-17.00												
17.15-18.00										Transfer to Warsaw		
18.15-19.00									Grill			
19.15-20.00												
Lecturer	Piotr Lichota	Zbigniew Rarata	Dawid Maleszyk	Sebastian Topczewski	Agnieszka Kwiek			Mateusz Sochacki	Paweł Waliński	Waldemar Winiarski	Dominik Głowacki	Zbigniew Rarata