Master degree study programme

AEROSPACE ENGINEERING
Avionics

Director of the program: Assoc. prof. Jan Roháč, PhD., Dept. of Measurement, FEE-CTU
Student’s profile

Practical & theoretical background in areas:
- aircraft instrumentation, sensors, principles, RF communication and navigation means,
- aerodynamics and flight mechanics,
- aircraft structures, material & propulsions,
- flight control systems,
- unmanned aerial vehicles, space engineering,
- electronic circuits design and development,
- programming of measurement and embedded systems.

Complementary/transferable skills:
- presentation skills,
- academic writing.

Emphasis put on:
- creativity development
- thinking skills, teamwork & independence

ELECTROTECHNICS & INFORMATICS
PROPULSION STRUCTURES
AI, CONTROL SYSTEMS
SPACE
Programme character

Multi-disciplinary education – Dept. of:

✓ Measurement

✓ Control

✓ Radio electronics

✓ Computer science

✓ Fluid Mechanics & Thermodynamics, Aerospace Engineering - FME
# Courses

<table>
<thead>
<tr>
<th></th>
<th>Aircraft Avionics</th>
<th>Project Management and Marketing</th>
<th>Aerodynamics and Flight Mechanics</th>
<th>Presentation Skills</th>
<th>Space Engineering</th>
<th>Elective</th>
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<td>2</td>
<td>Team Project</td>
<td>Integrated Modular Avionics</td>
<td>Unmanned Vehicles</td>
<td>Academic Writing</td>
<td>Compulsory elective</td>
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Diploma thesis
International cooperation

- student mobility
- joint diploma theses supervision
- student conferences
- projects

PEGASUS cities

<table>
<thead>
<tr>
<th>Country</th>
<th>Institution</th>
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<tbody>
<tr>
<td>France</td>
<td>Ecole-air de Salon de Provence, ENAC Toulouse, ENSMA Poitiers, ISAE-SUPAERO Toulouse</td>
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<tr>
<td>Germany</td>
<td>RWTH Aachen, TU Berlin, TU Braunschweig, Universität Stuttgart, TU Dresden</td>
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<td>Italy</td>
<td>Politecnico di Milano, Politecnico di Torino, Università degli Studi di Bologna, Università degli Studi di Napoli, Università degli Studi di Pisa, Università degli Studi di Roma</td>
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<td>UK</td>
<td>Cranfield University, University of Bristol, University of Glasgow</td>
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<td>The Netherlands</td>
<td>TU Delft</td>
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<td>Sweden</td>
<td>KTH Stockholm</td>
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<td>Spain</td>
<td>UPM/ETSI Madrid, US/ESI Sevilla, UPV/ETSID Valencia</td>
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<td>Czech Republic</td>
<td>CVUT Prague</td>
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<td>Portugal</td>
<td>IST Lisboa</td>
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<td>Poland</td>
<td>Politechnika Warszawska</td>
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Examples of drones we fly with
Experiments with „home-made“ navigation systems

Team projects & diploma theses are focused on hands-on experience in HW & SW/FW development
Aerial vehicle control in practice
Autonomous aerial vehicle operation

Agent-based control of heterogeneous teams of cooperative entities executing a mission

- Trajectory planning: terrain, no-flight zones, physical constraints
- Autonomous behavior: team action planning, task decomposition, simultaneous surveillance and tracking
- Conflict detection and resolution: algorithms for cooperative and non-cooperative collision avoidance based on exchange of flight plans and prediction of movement
- Advanced software simulations: tactical planning – ISTAR missions, integrations of UAS into shared airspace, simulation of manned air traffic and air traffic control
“Remote sensing” in practice

- Modifications of existing UAV platforms for industrial use
- Algorithms for data gathering and fusion (RGB camera, LiDAR, GPS, IMU)
- System for 3D forestry scanning using LiDAR and photogrammetry
  - Estimate volume of wood
  - Health status
  - Count and determine animals
- Automated inspections
Water rocket – experimental high-g vehicle

Ing. Petr Kočárník, Ph.D.
Department of Electric Drives and Traction

Říká se, že pro vodní rakety leží „hranice vesmíru“ ve výšce 100 metrů. U raket z běžných PET lahví není snadné tuto hranici pokořit.

https://www.youtube.com/watch?v=CtKtYfsPSuk
Study programme **Aerospace Engineering**
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WWW: [https://aerospace.fel.cvut.cz/](https://aerospace.fel.cvut.cz/)

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