Module title			Abbreviation
Introduction to Flight Mechanics			10-LURI-FD-252-m01
Module coordinator		**Module offered by**	
Dean of Studies Informatik (Computer Science)		Institute of Computer Science	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Introduction to the fundamentals of flight mechanics and coordinate systems used
Derivation of various flight motion models for fixed-wing aircraft

- Nonlinear equations of motion with 6 degrees of freedom (translation and rotation)
- Simplified models with 3 degrees of freedom (translation only)
- Criteria for selecting appropriate models depending on analysis goals
- Structure, initialization, and parameterization of flight simulations
- Computation of steady-state flight conditions
- Linearization of 6-DOF equations of motion
- Time-domain analysis of flight dynamics (stability, eigenmotions)
- Contextualization of flight mechanics with system theory, aerodynamics, and control theory

Intended learning outcomes

Students will understand the dynamic behavior of fixed-wing aircraft in atmospheric flight. They will be able to characterize, linearize, and analyze flight motion models with 3 and 6 degrees of freedom. They will compute steady flight conditions and assess their stability. Students will also be capable of building and interpreting simple flight simulations with regard to flying qualities.

Courses (type, number of weekly contact hours, language — if other than German)

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Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate).
creditable for bonus

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Aerospace Computer Science (2025)
Exchange Program Computer Science (2025)

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