



Luftfahrzeugkonstruktion I *(Aircraft Structural Design I)*

Degree program: Mechanical Engineering diploma degree / bachelor degree

Program modules: MB-LRT-05 – Luftfahrzeugtechnik (*Aircraft Engineering*)

MB-LRT-04B – Grundlagen der Luftfahrzeugkonstruktion
(Fundamentals of Aircraft Structural Design)

Course Objectives:

The main aim of the course is to introduce students to the analysis and design of aircraft structures. After the course the student should be able

- to determine the relevant air and ground loads for the structural design of aircraft components
- to understand role and lay-out of main structural members of load carrying airframe components as well as the relevant basic design philosophies

and

- to apply engineering methods for the strength analysis of thin walled aircraft structures

Course Topics:

The course covers following topics:

- Airworthiness requirements
- Structural design loads
- Load carrying structural members of airframes
- Design requirements, concepts and philosophies
- Airframe materials and selection criteria
- Loading actions, bending, torsion and shear
- Stress analysis of thin walled open and closed beams under bending and torsion
- Stress analysis of shear webs

Class Schedule: 3 hours per week (2 h lectures, 1 h exercise)

Credits: 4 ECTS credit points / 4LP

Offered: in spring/summer term (Sommersemester; April – July)

Prerequisites:

Basic courses in *structural mechanics* and *aerospace materials*

Course Material:

The course material can be found at:

<https://tu-dresden.de/ing/maschinenwesen/ilr/ift/studium/sose/lfk1>

Download instructions are provided in the course.

Further reading:

Megson, T.H.G.

Aircraft Structures for Engineering Students,

Elsevier Ltd., Oxford, 6th Ed., 2016

Wright, J.R.; Cooper, J.E.

Introduction to Aircraft Aeroelasticity and Loads, John Wiley & Sons, Chichester, 2nd Ed., 2015

C. Rossow, C.; Wolf, K.; Horst, P.

Handbuch der Luftfahrzeugtechnik, Hanser Verlag, 2014

Niu, M.C.Y.

Airframe Stress Analysis and Sizing, Adaso/Adastra Engineering Center, Northridge, USA, 3rd Ed., 2011

Donaldson, B.K.

Analysis of Aircraft Structures – An Introduction,

Cambridge University Press, New York, 2nd Ed., 2008

Wiedemann, J.

Leichtbau – Elemente und Konstruktion,

Springer Verlag, Berlin / Heidelberg, 3. Aufl., 2007

Niu, M.C.Y.

Airframe Structural Design,

Technical Book Company, Los Angeles, 1997

Lomax, T.L.

Structural Loads Analysis for Commercial Transport Aircraft: Theory and Practice,

AIAA Education Series, Reston, USA, 1996

Kossira, H.

Grundlagen des Leichtbaus,

Springer Verlag, 1996

Bruhn, E.F.

Analysis and Design of Flight Vehicle Structures,

Jacobs Publishing, Carmel, USA, 1973

Evaluation Method: Written examination (2 hours)

Language: The lecture is given in German