



Aircraft Manufacturing

Course Objectives:

The main aim of the course is to introduce students to the principles and practices of modern aircraft manufacturing. Specific manufacturing processes are addressed as they relate to the production of major aircraft components made of conventional metals as well as fibre reinforced plastic composites. Emphasis is given to process capabilities and limits, tooling considerations, materials requirements and constraints, economics of production and design producibility.

The learning outcomes of the course are expected to be:

- to understand the effect of material characteristics on manufacturing technologies
- to gain an overview of the characteristics of the main processes associated with aircraft manufacturing
- to provide sufficient knowledge on production technologies to ensure meaningful and productive discourse with manufacturing experts
- to understand the close relationship between design and manufacturing in the aircraft development process

Course Topics:

The course includes following topics:

- Introduction to materials used in aircraft structures
- Semi-finished products
- Manufacturing equipment and tooling
- Technologies for manufacturing of components
- Assembly
- Quality assurance

In addition the course includes a compulsory oral presentation on manufacturing technologies.

Class Schedule: 4 hours per week (2 lectures, 2 exercises)

Credits: 6 ECTS credit Points

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

Prerequisites:

Basic courses in *aircraft engineering* and *aerospace materials*

Course Material:

Course material is provided on the web page

http://tu-dresden.de/die_tu_dresden/fakultaeten/fakultaet_maschinenwesen/ilr/aero/studium/lff

Instructions on how to download this material are given during the first lecture.

Further Reading:

F.C. Campbell

„Manufacturing Technology for Aerospace Materials“, Elsevier Ltd., Oxford, 2008

A.B. Strong

„Fundamentals of Composites Manufacturing“, Society of Manufacturing Engineers, Dearborn, USA, 2nd ed., 2008

M. Neitzel; P. Mitschang

„Handbuch Verbundwerkstoffe – Werkstoffe, Verarbeitung, Anwendung“, Carl Hanser Verlag, München, 2004

M. Flemming, G. Ziegmann, S. Roth

„Faserverbundbauweisen, Fertigungsverfahren mit duroplastischer Matrix“, Springer-Verlag, Berlin/Heidelberg, 1999

B.T. Aström

„Manufacturing of Polymer Composites“, Chapman & Hall, London, UK, 1997

M.C.Y. Niu

„Composite Airframe Structures“, Technical Book Company, Los Angeles, 1996

M. Flemming, G. Ziegmann, S. Roth

„Faserverbundbauweisen, Halbzeuge und Bauweisen“, Springer-Verlag, Berlin/Heidelberg, 1996

M. Flemming, G. Ziegmann, S. Roth

„Faserverbundbauweisen, Fasern und Matrices“, Springer-Verlag, Berlin/Heidelberg, 1995

Assessment: Written examination (90 minutes) & oral presentation