

Lightweight Design

of Aircraft Structures

7th - 11th March 2005



Hochschule für Angewandte Wissenschaften Hamburg
Hamburg University of Applied Sciences



W·In·Q e·V

AIM

The objective of this module is to provide specific hints for advanced work within the important area of lightweight design especially concerning aircraft structures. Certification and economic aspects are considered as well.

TARGET DELEGATES

This module is intended for graduate engineers, equivalent professionals and managers. It is assumed that the participants are generally familiar with the topics of lightweight design. It is likewise suitable for specialists in search of a broader perspective, and for junior experts in this field.

LEARNING OUTCOMES

On completion of the module delegates will be able to:

- understand the design process of lightweight structures depending on various requirements in aircraft design
- evaluate the properties, performance and application of typical materials
- know how to solve different structural problems by appropriate analytical and numerical methods
- understand the influence of structures design on reliability, safety and economics of aircrafts

LEARNING ENVIRONMENT

The module will include lectures with examples of applications, laboratory work, computer-aided work and discussions.

PRE-MODULE STUDY

Delegates will be expected to undertake preparation work using pre-course material and reference literature.

MODULE CONTENT

The module is organized in accordance with the subsequent sub-modules:

- Introduction, overview to aircraft structures
- Loads, design rules, materials, design methods, analytical approaches
- Special Applications of the Finite Element Method:
Buckling, Vibration Modes, Nonlinearities (PATRAN/NASTRAN)
- Composite Materials: theory of laminates, specific effects of laminates, rules for design and fabrication
- Crashworthiness: general design rules, methods of calculation (LSDYNA)
- Optimization: general basics, different methods, numerical solutions
- Aeroelasticity: general basics, different methods, analytical and numerical solutions

VENUE & MODULE LEADER

University of Applied Sciences Hamburg (HAW), Hamburg, Germany

Module Leader:

Prof. Dr.-Ing. Hans Flüh, Department of Automotive and Aircraft Engineering,
Berliner Tor 9, 20099 Hamburg, Tel. +49/40/42875 - 7854 Fax +49/40/42875 - 7809,
E-Mail: flueh@fzt.haw-hamburg.de

SUBMODULES & LECTURERS

Design Principles: Prof. Dr. Flüh (HAW)

Structural Analysis: Prof. Dr. Dehmel (HAW)

Composites: Prof. Dr. Seibel (HAW) / Dr. Herbeck (Department leader Structures-Technology, DLR)
Crashworthiness: Prof. Dr. Schumacher (HAW) / Dr. Beesten (Leader Occupant Safety Simulation, Volkswagen)

Numerical optimization: Prof. Dr. Schumacher (HAW) / Dr. Harzheim (Project Leader Optimization, Adam Opel AG)

Aeroelasticity: Prof. Dr. Zingel (HAW)

MODULE PROGRAMME

	Monday 7 th March	Tuesday 8 th March	Wednesday 9 th March	Thursday 10 th March	Friday 11 th March
8:30					
9:00	Welcome Introduction	Structural Analysis (1.5 hL)	Structural Analysis (1.5 hL)	Numerical Optimization (1.5 hL)	Numerical Optimization (1.5 hL)
10:00	Design Principles (1.5 hL)				
11:00	Design Principles (1.5 hL)	Structural Analysis (2 hL)	Structural Analysis (1.5 hL)	Numerical Optimization (1.5 hL)	Numerical Optimization (1.5 hL)
12:00	Design Principles (1.5 hL)				
13:00	Break	Composites (1.5 hL)	Structural Analysis (1.5 hL)	Aeroelasticity (1.5 hL)	Aeroelasticity (1.5 hL)
14:00	Composites (1.5 hL)	Composites (1.5 hL)	Break		
15:00	Break				
16:00	Design Principles Laboratory work (2 hL)	Composites (1.5 hL)	Crashworthines (1.5 hL)	Crashworthines (1.5 hL)	Aeroelasticity Laboratory work (1 hL)
17:00			Break	Break	
18:00		Composites Laboratory work (1.5 hL)	Crashworthines (1.5 hL)	Crashworthines Laboratory work (1.5 hL)	Module Evaluation
19:00					Farewell

hL = hour lecturing

TuTech
EUROPADS
WINQ

TuTech was founded in 1992 by the Technical University of Hamburg-Harburg by outsourcing of the former industrial liaison office of the Technical University. TuTech nowadays is a the central agency for technology transfer in Hamburg. The main activities are the management and carrying out of contract research projects and technical exploitation of R&D-results: technical consultancy, training, organization of congresses and fairs plus the support of young technology-oriented companies.

The Continuing Professional Development module is in line with the ideas and targets of EUROPADS. EUROPADS was a pilot project financed by the European Commission under the LEONARDO DA VINCI programme, providing a modular **EURO**pean **PRO**fessional **AER**ospace **DEV**elopment Scheme for engineers and technical managers within the European aerospace industry involving universities and leading aerospace companies from six countries.

The Weiterbildungszentrum WINQ e.V. of the University of Applied Sciences Hamburg provides courses and Continued Professional Development especially for professionals in full time employment. Since 1995 WINQ offers high-value seminars and courses at low prices to all interested people who want to develop their career. Example of these are our courses in "Practical business economy" and "Communication, leadership and organization". For further information please visit our website: <http://www.winq.de> or feel free to send us a mail at: info@winq.de"

COST

Module fee: € 1280.00 (+ 16% VAT) inclusive didactical material, coffee breaks and lunches (transport, accommodation and dinner are not included). The module may be cancelled if a minimum number of registrants is not reached; all fees will be refunded. Registrants who cancel before 10th February 2005 will receive full refund, no refunds given for cancellation after 10th February 2005, but substitution of a registrant is accepted at any time. After we receive your application we will send you an invoice which will also serve as confirmation of your registration.

APPLICATION & ENQUIRY FORM

I wish to enrol for the Module "Lightweight Design of Aircraft Structures"

Name -----

Function -----

Organization -----

Address -----

Phone ----- Fax -----

E-Mail -----

Please forward this slip by 10. February 2005 to TuTech - Attn. Gerlinde Löbkens, Harburger Schloßstrasse 6-12, 21079 Hamburg, Germany. Tel: +49/40/76629 6551, Fax: +49/40/76629 6559, E-Mail: loebkens@tutech.de; <http://www.tutech.de/veranstaltungen>



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