

t.ADA - Advanced Aerodynamics

Person responsible for the course:	Leonardo Manfredini, mani
Credits:	4
Valid for:	2009/2010
Last saved:	06.07.2010 14:20

Learning objectives:

Based on the lecturers twenty years experience as an aerodynamicist in the aircraft industry, this course deals with the practical applications of aerodynamics to aircraft design, development, certification and support. Particular attention will be given to configuration concepts, prediction of performance and stability, off design cases, and the appropriate use of computational, experimental and handbook tools.

Learning objectives:

- get a basic comprehension of the main issues and problems in aircraft aerodynamic design;
 - be able to give a preliminary estimate of performance and stability characteristics for a new aircraft configuration;
 - learn how aerodynamics interacts with other disciplines in the design process;
 - learn how different design tools can be used in the various stages of the design process and how to interpret their results.
-

Course content:

Review of aerodynamic principles

- Foundations
- Transonic aerodynamics
- Flow separation and vortex flow

Preliminary aerodynamic design

- Aircraft configuration concepts
- Prediction of performance and stability characteristics
- Integration of aerodynamics in the design process
- Aerodynamic development

Airfoil and wing design

- High lift devices
- Aerodynamic interference
- High angle of attack aerodynamics
- Flow separation control
- Engine and secondary air intakes
- Aerodynamic problem solving

Tools and methodology

- Computational, experimental and ?handbook? methods
 - Wind tunnel testing technique
 - Flight testing
-

Previous knowledge:

Basic knowledge in fluid mechanics

Teaching method:

Type of lesson:	Number of lessons per week:
Lecture	10*4
Tutorial/Practicum	4*4
Group teaching	
Block instruction	
Seminar	

Assessment:

According to the table or as specified in writing by the lecture at the beginning of the semester!

Number	Type	Weighting
1	Final exam	60%
1	Exam during the semester	
1	Team project	40%

Language of instruction:

English

Instruction material:

slides, course notes

Civil Jet Aircraft Design, Jenkinson, Simpkin, Rhodes, AIAA Education Series, 1, 1999

Aerodynamics for Engineering Students, Houghton, Carpenter, Elsevier, 5, 2003

Introduction to Flight, Anderson, McGraw Hill, 5, 2005

Comments:

-