

## t.ADA - Advanced Aerodynamics

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<b>Person responsible for the course:</b>	Leonardo Manfredini, mani
<b>Credits:</b>	4
<b>Valid for:</b>	2010/2011
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### 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, 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.
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### 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
- High angle of attack aerodynamics
- Flow separation control

Tools and methodology

- Computational, experimental and "handbook" methods
  - Wind tunnel testing techniques
  - Flight testing
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### Previous knowledge:

Basic knowledge in fluid mechanics

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**Teaching method:**

Type of lesson:	Number of lessons per week:
Lecture	14*2
Tutorial/Practicum	14*2
Group teaching	
Block instruction	
Seminar	

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**Assessment:**

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

Number	Type	Weighting
1	End of term exam	70%
1	Research or design project	20%
1	Presentation of the project	10%

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**Language of instruction:**

English

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**Instruction material:**

Presentations and course notes.

Selected literature:

- Houghton and Carpenter: Aerodynamics for Engineering Students, Elsevier, ISBN 0-7506-5111-3
- Ed Obert: Aerodynamic Design of Transport Aircraft, TU Delft, ISBN 978-1-58603-970-7
- Jenkinson, Simpkin and Rhodes: Civil Jet Aircraft Design, AIAA Education Series, ISBN 1-56347-350-X

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**Comments:**

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