Programme

LECTURE SERIES
2011-2012

VKI-LS

- ☐ INTRODUCTION TO MEASUREMENT TECHNIQUES
  October 10-14, 2011
- ☐ UNCERTAINTY QUANTIFICATION IN COMPUTATIONAL FLUID DYNAMICS (RTO-AVT-VKI)
  October 24-28, 2011
- ☐ ENGINE INTAKE AEROTHERMAL DESIGN : SUBSONIC TO HIGH SPEED APPLICATIONS (RTO-AVT-VKI)
  November 14-16, 2011
- ☑ INTRODUCTION TO CFD
  January 16-20, 2012
- ☐ STRUCTURAL DESIGN OF AIRCRAFT ENGINES (RTO-AVT-VKI)
  January 23-27, 2012
- ☐ LARGE EDDY SIMULATION AND RELATED TECHNIQUES: THEORY AND APPLICATIONS
  February 6-10, 2012
- ☐ AIRCRAFT NOISE
  March 12-16, 2012
- ☐ FLUID DYNAMICS ASSOCIATED TO LAUNCHER DEVELOPERS (RTO-AVT-VKI)
  April 2-6, 2012
- ☐ INTRODUCTION TO OPTIMIZATION AND MULTIDISCIPLINARY DESIGN IN AERONAUTICS AND TURBOMACHINERY
  May 7-11, 2012
- ☐ COMBUSTION IN AERO ENGINES
  June 4-8, 2012
- ☐ ACCURATE TEMPERATURE MEASUREMENTS
  September 2012

OTHER EVENTS

- ☐ SHORT COURSE ON RADIAL COMPRESSOR
  February 6-10, 2012
- ☐ SYMPOSIUM OF VKI PHD RESEARCH 2012
  March 5-7, 2012

(Please correct your address if necessary)

Lecture Series Secretary
von Karman Institute for Fluid Dynamics
72 Chaussée de Waterloo
B-1640 Rhode-St-Genèse
Belgium

January 16-20, 2012

INTRODUCTION TO COMPUTATIONAL FLUID DYNAMICS

von KARMAN INSTITUTE FOR FLUID DYNAMICS

INTRODUCTION

The objective of this course is to provide an elementary tutorial presentation on computational fluid dynamics (CFD), emphasizing the fundamentals and surveying a variety of solution techniques whose applications range from low speed incompressible flow to hypersonic flow. The course is aimed at persons who have had little or no experience in this field, both recent graduates as well as professional engineers, and will provide

- an insight into the philosophy and power of CFD
- an understanding of the mathematical nature of the fluid dynamics equations
- a familiarity with various solution techniques

At the conclusion of the course, an attendee will be well prepared to understand the literature in this field, to follow more sophisticated state-of-the-art lecture series, and to begin the application of CFD to his or her special areas of concern. While the techniques to be discussed will be applicable to all fields of fluid dynamics, the lecturers and the majority of examples presented will carry a strong flavor of aeronautics.

The Director of this lecture series is Professor G. Degrez of the von Karman Institute.

VON KARMAN INSTITUTE
FOR FLUID DYNAMICS

TIMETABLE

Monday 16 January 2012

08:45 Registration
09:15 Welcome, introductory remarks
09:45 Basic philosophy of CFD
Prof. J.D. Anderson, Jr., University of Maryland, USA
11:00 Forms of the governing equations particularly suited for CFD: non-conservative, conservative, flux vectors
Prof. J.D. Anderson, Jr.
14:00 Mathematical properties of the fluid dynamic equations : influence on appropriate numerical techniques; stability considerations
Prof. J.D. Anderson, Jr.
15:45 Mathematical properties of the fluid dynamic equations (continued)
Prof. J.D. Anderson, Jr.
17:00 Reception

Tuesday 17 January 2012

09:00 Discretisation of partial differential equations : finite differences
Prof. J.D. Anderson, Jr.
11:00 Discretisation of partial differential equations (continued)
Prof. J.D. Anderson, Jr.
14:00 Transformation and grids
Prof. J.D. Anderson, Jr.
15:45 Explicit methods for inviscid and viscous compressible flows
Prof. J.D. Anderson, Jr.

Wednesday 18 January 2012

09:00 Explicit methods (continued)
Prof. J.D. Anderson, Jr.
11:00 Implicit time dependent methods for inviscid and viscous compressible flows
Prof. G. Degrez, von Karman Institute, Belgium
14:00 Implicit methods (continued)
Prof. G. Degrez
15:45 Implicit methods (continued)
Prof. G. Degrez

Thursday 19 January 2012

09:00 Implicit methods (continued)
Prof. G. Degrez
11:00 Finite volume methods
Prof. E. Dick, University of Gent, Belgium
14:00 Finite element methods
Prof. E. Dick
15:45 Finite element methods (continued)
Prof. E. Dick

Friday 20 January 2012

09:00 Aspects of CFD computations with commercial packages
Prof. J. Vierendeels, University of Gent, Belgium
11:00 A brief introduction to turbulence models
Dr.-Ing. F. Menter, Ansys, Germany
13:45 A brief introduction to turbulence models (continued)
Dr.-Ing. F. Menter
15:00 Adjourn

Lunch will be taken from 12h30 to 13h45. Coffee breaks are scheduled each morning and afternoon. The afternoon sessions will normally finish at about 17h00.

ONLINE REGISTRATION AVAILABLE

http://www.vki.ac.be/registration

It is highly recommended that the registration is sent at the latest 15 days before the beginning of the course. A letter of acceptance and additional information will be sent on receipt of the application form.

COURSE FEE

The fee for the lecture series is 1350 euro, applicable to citizens of NATO countries contributing to the financing of the VKI (Belgium, Czech Republic, France, Germany, Hungary, Iceland, Italy, Luxemburg, Norway, Portugal, Spain and Turkey). For citizens of other NATO countries and of NATO partner countries, the fee is 1760 euro. For non-NATO citizens the fee is 1920 euro. These prices include 21% VAT. The fee includes printed notes, lunches, beverages, and administrative costs. Lectures will be given in English and printed notes will be distributed during registration.

FELLOWSHIPS

To encourage greater participation in our Lecture Series programme by university members, the Institute has established a limited number of VKI Lecture Series fellowships for citizens of NATO countries contributing to the financing of the VKI, as well as for citizens of other NATO countries and NATO partner countries coming from a university in a VKI financing country. The recipient of such fellowship is entitled to attend the Lecture Series at a reduced fee, which will be 675 euro (VAT included) for assistants not having a Ph.D. degree and for Ph.D. candidates, and 300 euro (VAT included) for undergraduate students. For non-NATO citizens coming from a university in a VKI financing country, the fee is 960 euro (VAT included) for assistants not having a Ph.D. degree and for Ph.D. candidates, and 400 euro (VAT included) for undergraduate students.

The request to be considered for an award must accompany the application to attend the Lecture Series, and the applicant must provide a recommendation letter from his or her professor; if not done so, the request will not be taken into consideration. All possible alternative sources of funding should be investigated before aid is requested under this scheme, so that those most in need will benefit.

METHODS OF PAYMENT

Payment 2 weeks prior to the beginning of the course (name and course title clearly indicated) by bank transfer to our account Nr 210-0315330-35 at BNP Paribas Fortis Bank, avenue de la Forêt de Soignes 322, 1640 Rhode-Saint-Genèse, Belgium, IBAN BE57 2100 3153 3035 (strongly recommended). SWIFT BIC GEBABEBB. *Late registration can be paid in cash (euro), or by VISA or Eurocard at the beginning of the course.*