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## ***Syllabus for the course Experimental Thermal and Fluid Dynamics***

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### **Course Information – Fall 2016**

Class Section: MECH 6376.501.16F  
Course Title: Experimental Thermal and Fluid Dynamics  
Class Level: Graduate  
Class Credits: 3 Credits  
Room: ECSN 2.126  
Time: Monday and Wednesday 7:00pm-8:15pm  
Starts: August 22, 2016  
Ends: December 15, 2016

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### **Professor Contact Information**

Prof. Giacomo Valerio Iungo  
Office: WSTC 2.208  
Phone: 4621  
Email: [valerio.iungo@utdallas.edu](mailto:valerio.iungo@utdallas.edu)  
Office hours: Wednesday 14:30-5:00 pm, or by appointment requested via email

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**Course prerequisite:** Approval by the Instructor required

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### **Course Description:**

This course aims to provide fundamental notions on the role of experimental research in fluid mechanics and thermodynamics. The most common measurement techniques in the thermo-fluid sciences will be described. Particular attention is paid to the description of the different typologies of wind tunnels and related experiments. Fundamentals in statistical, spectral and time-frequency analysis are covered.

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### **Student Learning Objectives/Outcomes**

Once the student will have fulfilled her/his responsibility (e.g. attend classes, be attentive, study the assigned material, among others), the following goals will be achieved:

- In-depth understanding of the role of experimental thermo-fluid dynamics;
  - Understanding of the specifications of different measurements techniques;
  - Design of an experimental project;
  - Execution of a basic experiment in fluid mechanics and data analysis.
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### **Suggested Textbooks and Materials**

Lecture slides will be provided by the instructor. The suggested textbook is the following:

- J. B. Barlow, W. H. Rae, A. Pope. Low-speed wind tunnel testing. Third edition, John Wiley & Sons, inc. 1984, ISBN 0-471-55774-9
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### **Assignments & Academic Calendar**

Week 1	Review of fundamentals in fluid mechanics and flow similarity
Week 2	Types of Wind Tunnels
Week 3	Wind Tunnel design and the UTD wind tunnel
Week 4	Experiments and data correction, Review W1-W4
Week 5	Pressure measurements

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Week 6	Hot-wire anemometry
Week 7	Laser Doppler Velocimetry
Week 8	Particle Image Velocimetry
Week 9	Wind LiDAR and atmospheric measurements
Week 10	Density and temperature measurements, Review W5-W10
Week 11	Data acquisition
Week 12	Statistical and spectral analysis
Week 13	Time-frequency analysis
Week 14	Modal decomposition techniques
Week 15-16	Laboratory for wind LiDAR measurements, Final

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### **Grading Policy**

Pop Quiz	10%
Midterm 1	20%
Midterm 2	20%
Laboratory	20%
Final (Comprehensive)	30%

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### **Policies and Procedures for Students**

The University of Texas at Dallas provides a number of policies and procedures designed to provide students with a safe and supportive learning environment. Brief summaries of the policies and procedures are provided for you at <http://provost.utdallas.edu/home/index.php/syllabus-policies-and-procedures-text> and include information about technical support, field trip policies, off-campus activities, student conduct and discipline, academic integrity, copyright infringement, email use, withdrawal from class, student grievance procedures, incomplete grades, access to Disability Services, and religious holydays. You may also seek further information at these websites:

- [http://www.utdallas.edu/BusinessAffairs/Travel\\_Risk\\_Activities.htm](http://www.utdallas.edu/BusinessAffairs/Travel_Risk_Activities.htm)
  - <http://www.utdallas.edu/judicialaffairs/UTDJudicialAffairs-HOPV.html>
  - <http://www.utsystem.edu/ogc/intellectualproperty/copypol2.htm>
  - <http://www.utdallas.edu/disability/documentation/index.html>
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