Module level Master	Credit points 6	Language English	Return annual
Module designation Fluid Mechanics			
Course(s) 1. Advanced Fluid Dynamics 2. Experimental Methods in Fluid Mechanics			
Code	**Subtitle**		
Person responsible for the module	Prof. Dr.-Ing. Martin Lawerenz, Prof. Dr.-Ing. Olaf Wünsch		
Lecturer	1. Prof. Dr.-Ing. Olaf Wünsch 2. Prof. Dr.-Ing. Martin Lawerenz		
Workload	1. Workload: 120 h (20 h online presentation, 60 h private study, 40 h exercise) 2. Workload: 60h (7h online session, 14 h lecture, 14 h exercise, 25 h examination preparation)		
Relation to curriculum	Basic studies, compulsory optional subject		
Type of teaching, contact hours	Skype, virtual classrooms, Online-unit, digital communications		
Requirements according to examination regulations	None		
Recommended prerequisites None			

Module objective / intended learning outcomes

Students know how to model the fluid flow in wind energy systems and apply basic calculation methods in order to predict pressure, velocities, forces and momentums in technical systems.

Upon completion of the course , students will have abilities in terms of:

- Knowledge: Methods and devices to analyse the flow-field experimentally.
- Skills: Performing measurements and flow-field analysis and visualization using probes and optical sensors.

Competences: Establishing appropriate experimental setups, assessment of the measured data.

Content

Advanced Fluid dynamics

- Fluid- and aerostatic
- Dynamic of incompressible and compressible fluid flow
- Balance of mass and momentum
- Friction flow
- Dimensional analysis and similarity

Experimental Methods in Fluid mechanics

- Flow-Field Parameters.
- Pressure Measurement.
- Velocity Measurement
- Flow Visualization.
- Post-Processing & Data Reduction, Error Estimation.

Study and examination requirements and forms of examination	Written Test (120 min) or online oral examination (30 min)
Media employed	online script

Reading list

Baker, R. C.:Flow Measurement Handbook, Cambridge University Press, 2000
Durst, F.: Fluid Mechanics. Springer-Verlag, Berlin, 2009

Goldstein, R. J. (E.):Fluid Mechanics Measurements, Springer Verlag Berlin, 1983
Homsy,G.M.; Aref, H.: Multimedia Fluid Mechanics, Cambridge University Press, Cambridge, 2004
Krause, E.: Fluid Mechanics. Springer-Verlag, Berlin, 2005
Kundu, P.K.; Cohen, I.M.; Dowling, D.R.: Fluid Mechanics. Elsevier, Amsterdam, 2012
Spurk, J.H.; Aksel, N.: Fluid Mechanics. Springer-Verlag, Berlin, 2008
Tavoularis, S.:Measurements in Fluid Mechanics, Cambridge University Press, 2005
Tropea, Cameron; Yarin, Alexander L. & Foss, J. F. (Eds.):Springer Handbook of Experimental Fluid Mechanics, Springer-Verlag Berlin Heidelberg, 2007
White, F.M.: Fluid Mechanics. McGraw-Hill Inc., New York, 2003