



UNICUSANO

Università degli Studi Niccolò Cusano - Telematica Roma

Course Title	Dynamics of Turbulent Fluid Flows
Lecturer / Professor	Paolo Mele
Degree Course	Mechanical Engineering
ECTS	9
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Reference Book	-
Method of examination	Written and/or Oral
Topics Covered	
<p>Elements of Tensor Analysis, Velocity Gradient Tensor, Vorticity, Incompressible Heavy Viscous Fluids, Dimensionless Navier-Stokes equation, High and Low Reynolds Flows, Hydrodynamic Stability, Laminar and Turbulent Flow, Developed Turbulence and Predictability, Mean values, Turbulent Diffusivity, Time Average and Expected value, Reynolds equations, Average and Turbulent Kinetic Energy Balance, Role of the Vorticity, Spectral distribution of turbulent kinetic energy, Elements of numerical models of turbulence: the K – ϵ and the L.E.S model, Turbulent Boundary Layer and Uniform Turbulent Flow, Dimensional Analysis, Mechanical Similitude and Physical Models for incompressible heavy viscous fluids.</p>	
Course Objectives	
<p>The course objective is the increase of basic knowledge in the field of Fluid Mechanics, that is the Kinematics and Dynamics of Fluids, in order to predict the turbulent flow onset and to evaluate of the phenomenological behavior of turbulence. Schemes and models suitable for the treatment of engineering problems in the fluid flows are introduced.</p>	
Expected Results	
<p>This course is a prerequisite for subsequent courses in the field of Numerical Modeling application in Mechanical Engineering design.</p>	