FREDERICK UNIVERSITY CYPRUS

Subject: Aerodynamics– AMEE 401 / AUTO 400
Lecturer: Marios M. Fyrillas, Ph.D.
Number of periods per week: 3
Number of total weeks: 14

Objectives
To gain an understanding of the phenomena involved in fluid motion, and to understand and appreciate the different methods involved in solving fluid problems

Teaching Methods
Lectures and tutorials are used in this subject. Student evaluation is based on assignments, tests, and final exam.

Course Outline
- Review: Hydrostatics, Control Volume, Mass/Momentum/Energy Conservation, Navier-Stokes equations.
- Forces acting on an immersed body: Explain the nature of drag, lift, side-force and their relation to the pressure and shear stress distribution.
- Dimensional Analysis: Use of flow similarity and non-dimensional coefficients in aerodynamic modelling.
- Inviscid flow: stream-function, circulation and vorticity, potential flow solutions and superposition to evaluate lift and drag force on a body and determine the pressure distribution.
- Viscous flow: Effects of viscosity and turbulence on the drag force, boundary layer analysis.
- Applications of Aerodynamics.

Assessment:
- Final exam: 60%
- Coursework
  - Midterms: 25 %
  - Quizzes / Assignments: 15 %

Prerequisites: AMEE 202

Textbooks
- Fundamentals of Fluid Mechanics by Donald F. Young, Theodore H. Okiishi, Bruce Roy Munson: John Wiley & Sons, 4th edition, 2002.
- Fundamentals of Aerodynamics by John D. Anderson, McGraw-Hill Education, 2001.
- Road Vehicle Aerodynamic Design, R. H. Barnard, MechAero Publishing, 2001.
- Aerodynamics of Road Vehicles, W-H Hucho, SAE International 1998.
- Race Car Aerodynamics, Joseph Katz, Bentley Publishers, 2006.