

0.1 Introduction

0.1.1 Team

- Mehran Moazen
- m.moazen@ucl.ac.uk
- Office hours: Tuesdays 9:00 - 11:00 Room 502 Roberts

0.1.2 Assessment

FEA coursework:

- Coursework
- Software: ANSYS & MATLAB
- Breakdown: no. 1a weighting 20%, no. 1b weighting 30%
- Deadline: 14th Nov

CFD coursework:

- Coursework
- Software: CFD ACE & CFD GEOM
- Breakdown: no. 1a weighting 20%, no. 1b weighting 30%
- Deadline: 23rd Jan

0.2 FEA L1

0.2.1 Aims

- Understand the fundamentals concepts of the Finite Element Method
- Appreciate the structure of FE programs for potential amendment and development
- Expose aspects of the application of the method to engineering problems using a commercial software package (ANSYS)
- Taking a detached view in checking output and understand the limitations of the method

0.2.2 Textbooks

- Fagan, M.J. (1992) Finite Element Analysis - Theory and Practice. Lecture material stemming from this textbook
- Seshu, P. (2012) Textbook of Finite Element Analysis. Chapter to be read from this book

0.3 CFD L1

0.3.1 Aims

- Understanding the theoretical background
- Appreciating workflows and scheduling of pre-processing, simulation, post-processing and analysis
- Running commercial software packages and assessing their limitations
- Using post-processing to analyse and present the results
- Taking a detached view in checking output
- Appreciating the structure of codes for potential amendment and development

Specific Aims

- Theoretical basis of CFD, including governing equations for inviscid and viscous flows and equations for modelling turbulence
- CFD numerical methods covering discretisation schemes, including sources/sinks, with main focus on the Finite Volume approach. Numerical schemes for steady and unsteady diffusion and convection problems, pressure correction algorithms
- Overview of commercial CFD packages and their applications. Benefits and limitations, errors and accuracy

0.3.2 Assignment

2 CFD assignment files. Intake Manifold Study (PDF) to be the one most relevant. These files pertain to the description of the assignment you must complete. The assignment is split in two parts, which however will make a whole paper/report.

- The first part should include the *Introduction* and the *Numerical Methods* sections of the paper/report.
- The second part should include the *Results, Discussion and Conclusions* sections of the paper/report

To be submitted as a PDF document with a set format.