Transport Phenomena II (CENG0019)

Description

Aims:
To convey advanced concepts and their application to problem solving in the areas of fluid dynamics, transport phenomena (with focus on mass and linear momentum transport), non-Newtonian flow and mass transfer with chemical reaction.

Learning Outcomes:
On completion of this module students will be expected to:

- be able to apply the mass and linear momentum balance equations to analyze simple flow problems;
- be able to interpret the physical meaning of transport equations and estimate the relative importance of the terms featuring in them;
- be able to apply scaling and order-of-magnitude arguments to simplify transport equations before attempting to solve them;
- analyze problems involving diffusion of mass, linear momentum and energy;
- be able to analyze turbulent flows using simple modelling approaches;
- be aware of non-Newtonian fluid behavior and how to model it;
- analyze simple problems involving mass transfer with chemical reaction.

Synopsis:

- Mass and linear momentum balance equations (Eulerian and Lagrangian forms)
- Stress within a fluid and problem of closure
- Scaling of transport equations and order of magnitude analysis
- Penetration theory (diffusion of mass, linear momentum and energy)

Key information

Year: 2019/20
Credit value: 15 (150 study hours)
Delivery: UG L6, Campus-based
Reading List: View on UCL website
Tutor: Dr Luca Mazzei
Term: Term 2
Timetable: View on UCL website

Assessment

- Written examination (main exam period): 80%
- Coursework: 20%

Find out more

For more information about the department, programmes, relevant open days and to browse other modules, visit ucl.ac.uk

Disclaimer: All information correct as of June 2019. Please note that aspects of the module may be subject to change. UCL will make best efforts to inform applicants of major changes.
Boundary layer theory

- Turbulent flow (characteristics of turbulent flows, averaged transport equations, Reynolds stress, problem of closure, mixing length theory, Kolmogorov theory)
- Non-Newtonian fluids (shear thinning, shear thickening, Bingham fluids)
- Mass transfer with chemical reaction (film and penetration theories)

The Masters level (level 7) version of the module (CENG0019) has a stronger focus on unseen, and more open ended, problem solving.
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