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 August 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.
Chemical Engineering

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