

Transport phenomena



ECTS credits
4 credits



Semester
Fall

In brief

> **Course language:** English

Presentation

Learning objectives

Thermodynamics:

- remembering three laws of thermodynamics
- knowing and understanding definitions of energy, enthalpy and entropy
- knowing and understanding definitions of heat and temperature
- identify transforms of thermodynamic systems and begin able to identify relations between states related by a given transform

Continuum mechanics:

- knowing Reynolds transport theorem
- knowing and being able to compute strain and stress tensors for elastic media
- knowing and being able to compute strain and stress tensors for Newtonian fluids
- being able to derive governing equations for mass and momentum conservation in solids or fluids
- solving equations for laminar flows in classical configurations
- computing efforts inside an elastic solid in classical configurations
- computing efforts by a fluid on a solid in sample configurations
- having knowledge of constitutive laws for more complex media

Heat transfer:

- knowing all three modes of heat transfer
- being able to compute heat flux for all three heat transfer modes in classical configurations
- being able to establish the heat budget of a given system considering all relevant heat transfer modes
- begin able to compute relevant heat fluxes in classical configurations
- begin able to compute temperature of a system with heat transfer in steady state
- begin able to compute temperature of a system with heat transfer in transient state

Description of the programme

The course is split in three parts consisting of an overview of fundamental aspects of thermodynamics, continuum mechanics and heat transfer. The proposed lectures remain at an introductory level.

Teaching team

- Cécile BARON (CNRS - Institut de Recherche sur les Phénomènes Hors Equilibre)
- Pascal DENIS
- Frédéric SCHWANDER

Total des heures		32h
CM	Master class	24h
TD	Directed work	8h

Useful info

Name responsible for EU

Lead Instructor

Frédéric Schwander

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