

Physics of incompressible turbulent flows



Component
École Nationale
Supérieure
d'Électrotechnique
d'Électronique

In brief

- > **Ametys Code:** N9EM07A
- > **Open to exchange students:** No

Presentation

Objectives

This course describes the physical processes associated with energy transfer mechanisms in incompressible turbulent flows. It introduces the tools for describing and analyzing these flows. On completion of this course, students will be able to

- describe the physical mechanisms at work in turbulent flows
- calculate observables characterizing these flows
- analyze data from experiments or numerical simulations
- compare observations with existing theories
- use the mathematical formalism introduced in the course to describe and analyze other complex physical phenomena

Description

- Introduction
- Vorticity dynamics
- Link between energy, enstrophy and dissipation
- Phenomenological presentation of the energy cascade
- Description of isotropic homogeneous turbulence in physical space

- Description of isotropic homogeneous turbulence in spectral space
- Presentation of Kolmogorov's theory and its limitations