Physics of incompressible turbulent flows

Component
École Nationale Supérieure d'Électrotechnique d'Électronique

In brief

- **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