Combustion, Chemical kinetics, transfer and radiation

Niveau d'étude
BAC +5

Composante
UFR Sciences et Techniques

En bref

- **Langue(s) d'enseignement:** Français
- **Ouvert aux étudiants en échange:** Non

Présentation

Description

Combustion is still the world's most important and most widely used energy conversion technology. Potential environmental damage and limited resources of fossil fuels require more intensive efforts to better understand the underlying combustion processes. This course discusses the fundamentals of combustion science. The topics include combustion thermodynamics and chemical kinetics; characterization of fuels; premixed and diffusion flames; ignition, extinction, deflagration.

Objectifs

The course enables future engineers and PhD students to understand the basics of physics of combustion and to learn the fundamentals necessary to follow courses of turbulent combustion and numerical simulations of reactive flows.

Pré-requis obligatoires

Knowledge on the following topics are mandatory:

- Heat and mass transfer
- Differential equations
- Thermodynamics (First and Second law) and thermochemistry

Contrôle des connaissances

Contrôle continu + Examen terminal

Compétences visées

As specific objectives, by the end of the course students should be able to:

- Write and resolve local transport equations for simplified reactive flows (PSR, 1D premixed flame, 2D diffusion flame),
- Use CANTERA software package for thermodynamic applications and basic laminar flame computations with detailed chemistry,
- Understand the local laminar flame structure from experimental measurements, numerical simulations and transport equations,
- Understand the key mechanisms of pollutant emissions (NOx mainly) and how it impacts combustion chamber design

Infos pratiques

Lieu(x)

Saint-Étienne-du-Rouvray