

Numerical combustion for engines

Course code: ANC3

ECTS Credits: 2

Department	: ET	Lectures	: 5h00
Lecturers	: V. Robin	Tutorials	:
Year of study	: 2 nd year	Laboratory sessions	:
Semester	: 3 rd semester	Project	: 27h00
Assessment method(s)	: 1 written test, 1 project	Home works	:
Language of instruction	: English	Total hours	: 32h00
Type of courses	: Compulsory		

Objective: To be able to perform a numerical simulation of academic or industrial reactive flows.

Prerequisites: Combustion, Turbulence, Turbulent Combustion, and Basic of Numerical Methods

Content:

1. Prior to computation.

- Geometry and Meshes
- Boundary and Initial Conditions
- Fluid properties

2. Getting started with a Computational Fluid Dynamic solver.

- Range of possibilities
- Basic settings and adjustments
- Simulation tests

3. Numerical simulations

- Non reactive
- Reactive
- Laminar and turbulent reactive flows

4. Results analysis

- Sensitivity of numerical parameters
- Models behaviors
- Presentation

Recommended reading:

R. Borghi, M. Champion, *Modélisation et théorie des flames*, Editions TECHNIP, 2000

T. Poinso, D. Veynante, *Theoretical and Numerical Combustion*, Edwards, 2005

N. Swaminathan, K.N.C. Bray, *Turbulent Premixed Flames*, Cambridge University Press, 2011

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