Fluid Mechanics and Energetics

Master of science

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http://master-mfe.grenoble-inp.fr/

Objectives

The Master degree in Fluid Mechanics and Energetics

* englobes an advanced academic program based on thorough scientific and technological knowledge
* develops skills useful for the energy transition

in the fields of :

- Conventional energies : oil, gas, nuclear, hydraulics
- Sustainable energies : wind, marine, solar
- Transportation : aeronautics, automotive, rail,
- Industrial processes in many areas:
  - Waste and water treatment
  - Health and biotechnologies
  - Building
  - Food
  - Metallurgy

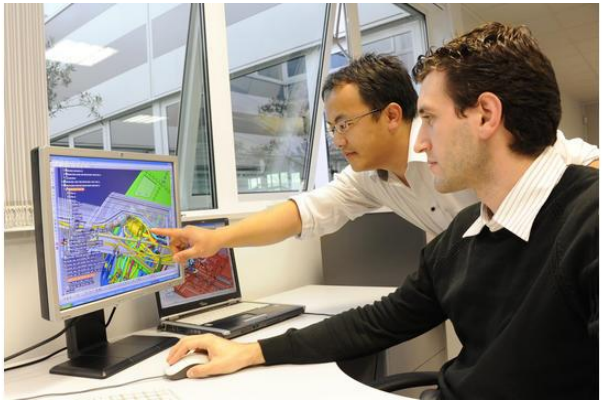
Targeted jobs

design engineer

test engineer

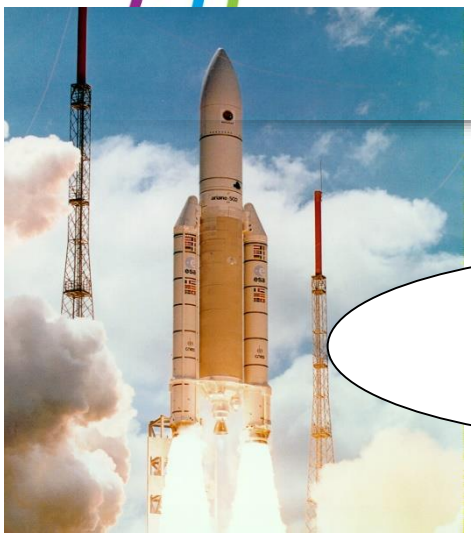
research & development engineer

simulation engineer



manager of a production unit

Targeted fields



Transportation

Conventional & Renewable Energies

Industrial hydraulics

Industrial heat transfers

Oil engineering

Process engineering

Skills developed through the FME curriculum

Propose	**technical specifications**	**for** • **hydromechanical** • **hydraulic** • **energy** **systems** **or** **energy or fluids** **networks**
Perform & analyze	**tests on a physical model or within an industrial process**	
Derive & apply	**global and local numerical models**	
Conceive	**prototypes, new products or new processes**	
Propose & conduct	**an applied research project**	

Teaching

Compulsory research courses (12 ects)

- Numerical simulation and modelling of turbulent flows
- Hydrodynamical stability
- Microfluidics and nanofluidics
- Signal analysis, random signals and stochastic processes

Elective courses (Choice of 3, 6 ects each)

- Advanced heat transfers and energetics
- Aerodynamics and combustion
- Sustainable marine energies
- Advanced fluid mechanics for processes
- Advanced numerical simulation
- Advanced simulation tools for mechanics
- Hydraulic machines and hydroelectricity

Master thesis

Criteria

- in the field of research in fluid mechanics and/or energetics
- in France or abroad
- in a laboratory or a company
- beginning in february, between 5 and 6 months long

Examples of master thesis

- EDF : Analyse d'essais expérimentaux de thermohydraulique dans le batiment réacteur
- Hydroquest : Development of tools related to the interaction between sea states and rotating machinery

- Liphy : Dispersion et temps de transit de globules rouges dans les capillaires
- Institut P' : Optimisation de la résolution des équations de Saint Venant
- CEA : Expériences et simulations écoulement non Newtonien dans un creuset oscillant

Connexions with research

Associated laboratories

- LEGI : geophysical and industrial fluid mechanics
- LRP : rheology, complex fluids, processes
- SIMAP : material and processes
- LEPMI : processes
- SMTH : thermohydraulics
- SBT : low temperatures
- GRETH : heat transfers
- …

Courses given by researchers and R&D engineers

Master thesis

Admission

Requirements

- B2 level in english, all courses are given in english
- applicants must have successfully passed:
  - one year of master (science or engineering) or equivalent,
  - an engineer diploma in :
    - Fluid mechanics, chemical engineering,
    - Physics or applied mathematics provided they have an initial level in fluid mechanics,
    - An engineer diploma or a master degree in engineering
- Students already registered in France in the 3rd year of an engineering school can also apply (special agreement required).

Application

- From october to may

Tuition fees

- European students 243€ / year
- Non european students 3770€ / year