



# International Master's Degree in THERMAL SCIENCE AND ENERGY

This programme is a second year specialty of Nantes Université's Master's degree in Mechanics. Through this training, students will acquire and expand their scientific and technological knowledge and practical experiences to understand and contribute to innovative research and development processes in the field of thermal energy. This will give them the opportunity to become fully involved in the various challenges of the energy transition.

## Syllabus

### Third semester (30 ECTS)

(i.e. first semester of this second year of master)

This semester is devoted to the acquisition and deepening of the mandatory fundamentals in thermal and energy sciences. They are systematically put into practice and illustrated both in the case of complex media (composite or heterogeneous materials, for example) and emerging applications of the energy transition.

- Fundamentals of heat transfer (physics and engineering approach of heat transfers : conductive, convective and radiative heat transfer)
- Experimental and digital methods (experimental methods and protocols, digital methods and tools)
- Fluid mechanics (fundamentals, turbulence and turbulent flow, hydrodynamic stability and dynamic systems)
- Heat transfer in solids, composites and heterogeneous media (heat transfer at interfaces, heat transfer during composite injection, heat transfer with phase change, polymers and composite thermophysical properties)
- Energy systems (thermal energy storage, system optimization, energy transition)

### Fourth semester (30 ECTS)

(i.e second semester of this second year of master)

This semester is dedicated to a fulltime scientific and technical internship (minimum 5 months) related to a research & development project conducted in academic labs or private companies.

Validations of both the exam session and the master internship (defense and report) lead to the French Master's Degree in Mechanics from Nantes Université.

## Academic calendar

Courses start in early September.



Concentrating solar technology - PROMES CNRS

## Skills

- > Perform engineering design of industrial projects
- > Conduct experimental and numerical analysis studies and analysing results

## Career Opportunities

The Master's environment should facilitate future involvement in international PhD top level programmes.

This programme leads students on to a wide range of R&D functions in many domains where energy management is involved. This can be the case in Energy production, Energy conversion/storage and valorization, Transportation industries (aeronautics, automotive), ....

### Business sectors

- > Energy systems and processes
- > Thermal based/driven technologies
- > Energy Process optimization (efficiency, decarbonation, waste heat valorization,...)
- > Energy transition, sustainable development.

### Hosting research lab

Research laboratory in Heat Transfer and Energy, Nantes Université and CNRS.

[www.polytech.univ-nantes.fr/ltn/en](http://www.polytech.univ-nantes.fr/ltn/en)



## POLYTECH NANTES

As the graduate school of engineering of Nantes Université, Polytech Nantes benefits from the scientific and educational environment of a university.

Polytech Nantes is the founding member of the Polytech group, a national network of 15 graduate engineering schools in France.

**20%**

foreign students

**+70**

Partner schools

# Admission

The Master's Degree is a two-year degree. At Polytech Nantes, only the second year is accessible, so applicants should hold a degree which is at least a 4-year degree in higher education (i.e. a 3-year Bachelor is not acceptable) and should be in one of the following fields: Applied Physics, Mechanical Engineering, Chemical Engineering.

Applicants should be able to demonstrate (from transcripts of their degrees) good knowledge in, not necessarily all, but in most of the following fields:

- > mathematics (tools for engineer)
- > thermodynamics
- > heat transfer
- > fluid mechanics
- > digital methods (coding)



# Location

The programme courses are located in Nantes, on the Chantrerie Campus which hosts several Graduate Schools, with over 4,000 students, two university restaurants, a technology library, as well as about 30 companies of advanced technology.

Nantes agglomeration (670,000 inhab.) is located close to the Atlantic Ocean and is regularly rated as one of the most pleasant French cities to live in. Thanks to its beautiful parks, efficient public transport and other policies for sustainable development, Nantes has been awarded the status of European Green Capital.



# Application

- > For students coming from a partner university with Polytech Nantes, please contact the international office coordinator of your home university concerning the enrolment.
- > For students coming from a country that is part of the Campus France procedure, please enrol with Campus France first, and then send us the requested documents below.
- > For students coming from a country that is not part of the Campus France procedure, please send us directly the following documents :
  - a detailed CV in English (including the precise content of your studies, which topics were studied each year, grades/marks obtained, score obtained for an international test of English, reports you may have written during your studies)
  - a cover letter
  - a complete transcript in English of years of study at the University
  - a copy of your passport

Complete the application form on our website:  
[www.univ-nantes.fr/polytech/internationalmasters](http://www.univ-nantes.fr/polytech/internationalmasters)

# Cost

The cost corresponds to education and training costs as well as French courses, cultural outings and student social security\*.

*\*It is included if you are less than 28 years old. If not, you will have to pay your own social security.*

More information :  
<https://polytech.univ-nantes.fr/en/financial-and-practical-information>

# Accommodation

The rent for students' accommodations may vary between €350 and €450 per month (allow for a deposit : usually 1 month rent). The housing market is saturated in September. It is highly recommended to seek accommodation in June or July. Expect to pay for insurance for any accommodation, as well as the housing tax for accommodation in town.

# Language

The programme mainly aims at international students and is taught in English. A good command of the English language is required (B2 score as defined by the Council of Europe).

# Contact

[master-te@univ-nantes.fr](mailto:master-te@univ-nantes.fr)

