



Master of Science (MSc)
Mechanical Engineering

ENERGETICS & PROPULSION

OBJECTIVES

This MSc develops skills for designing and optimizing innovative propulsion plants with a focus on thermofluid processes and energy conversion for research and industry.

Internal Combustion Engine and turbojet performance and efficiency are influenced by various processes including gas flow, compression and expansion through turbomachines or reciprocating piston, fuel injection and combustion, energy conversion and heat transfer. Therefore the curriculum offered in this program will provide an emphasis on all these processes and how they interact.



SKILLS

Specialism-specific

- > Design engines and components
- > Build and use simulation models of engines and powertrains
- > Develop control strategies and calibrate ECU engines

General

- > Identify models, perform simulation and analyse results
- > Communicate comprehensive results in a meaningful way
- > Undertake bibliographic surveys from international research and professional literature
- > Manage or be part of a project

JOB PROSPECTS & FURTHER PHD STUDIES

SECTOR: Automotive, Industrial engines, Aeronautics, Transportation, Power plants, Energy, HVAC for buildings.

FIELDS: Engine design & calibration, Modelling and simulation, Research and Innovation, Thermofluid Engineering, HVAC engineering.

JOB POSITIONS: Thermofluid Engineer, Design engineer, Calibration Engineer, Modelling Engineer, Research Engineer (post PhD).





Location
Nantes, France -2 hours from Paris

International campus life

87 nationalities
43% international students



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EXAMPLES OF FINAL YEAR INTERNSHIP/MASTER'S THESIS

- > Exploring oxy combustion operation in a single cylinder research engine
- > Implementation and optimization of a thermal runaway characterization system for Li-ion batteries
- > Dynamic coupling of multi-physics in a hot blast stove battery
- > CFD flow and thermal characterization of curing ovens of hydrogen tanks
- > Engine control: Development, Test and validation of a calibration.
- > Evaluation of new bearing material used in electric actuated valves for high-temperature applications in the exhaust system of internal combustion engines
- > Dual-fuel engine modeling with GT Power
- > Assistant Business Manager in HVAC

FACULTY, INDUSTRIAL PARTNERS AND RESEARCH LABS

This MSc programme relies on the Centrale Nantes' faculty, staff and research facilities of the LHEEA laboratory and in particular the Decarbonization & depollution of energy systems research group.

Companies with links to the programme

Alliance Renault-Nissan-Mitsubishi, Stellantis, Mann+Hummel, MAN Energy Solutions, Bosch, Total, Forvia, Honeywell Garrett, Siemens

OTHER PROGRAMME INFORMATION

- > Length of Studies: 2 years
- > Language of instruction: English
- > 3 semesters of courses and 1 semester of Master's thesis

Tuition & Fees - Scholarships - Application process - Deadlines

MORE INFORMATION AND FULL PROGRAMME:
www.ec-nantes.fr/masters

CONTACT: master.admission@ec-nantes.fr

CONTENT AND COURSES

(A Master Degree requires the validation of 120 ECTS credits)

M1 - AUTUMN SEMESTER	ECTS
Continuum Mechanics	5
Fluid Mechanics	5
Algorithmics for Engineering Modelling	4
Numerical Methods	5
Vibrations and Differential Equations	5
Business Environment	4
Modern Languages	2
Conferences	0
M1 - SPRING SEMESTER	ECTS
Fluid Mechanics 2	5
Mechanical Design	5
Energetics	5
Propulsion	5
Hydrodynamics	5
Conferences and Initiation to Research	3
Modern Languages	2
M2 - AUTUMN SEMESTER	ECTS
Combustion	4
Gas Dynamics and heat transfer	4
Turbomachinery	4
Internal Combustion Engines	4
Hybrid Powertrain and Energy Management	4
Practical and Simulation	4
Project	4
Modern Languages	2
M2 - SPRING SEMESTER	ECTS
Master Thesis or Industrial Internship (paid)*	30

*In France, for internships exceeding 2 months a minimum legal level of remuneration (approximately €600 per month) is fixed by the government. In some professional branches, this amount may be higher.

NB Course content may be subject to minor changes

École Centrale de Nantes. Direction de la communication. July 2023