

Mechanical Engineering

Energy, Flow & Process Technology

MSc Programme



The Energy, Flow and Process Technology (EFPT) master's track provides students with the theoretical knowledge, numerical and experimental skills, and practical experience they need to develop the next generation of energy and process technologies. EFPT students acquire expertise in the fundamentals (thermodynamics and fluid dynamics) and the technologies (energy production and storage, process intensification and multiphase systems) needed to enable the upcoming energy transition.

Degree	Master of Science in Mechanical Engineering
Starts	September
Credits	120 ECTS, 24 months
Language	English
Application deadline	April 1st: international students July 1st: Dutch degree
Tuition fee	€ 18.750 (non EU) € 2.083 (EU)
Scholarships	scholarships.tudelft.nl

The EFPT curriculum surrounds a small set of core courses with a large number of electives. The result is a flexible program that students can tailor to emphasize their personal interests in energy engineering, process engineering, or fluid mechanics. In addition, an internship and research project in the second year provides practical experience applying theoretical knowledge in an industrially relevant setting.

Energy Technology

One of the fundamental challenges for the future is the sustainable production of energy, with gradual emancipation from fossil fuels due to

their increasing scarcity and associated political danger. This can only be achieved by technological improvement and innovation. EFPT students who focus on energy technologies develop a thorough understanding of energy conversion and utilization. Students learn state of the art analysis tools and apply them to study efficient, environmentally friendly and integrated processes for the production and utilization of heat, power and secondary fuels like hydrogen. Students gain skills to apply their knowledge in sustainable next generation processes at both the system and component level.

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First Year	Second Year
Mechanical Engineering courses (14-17 ECTS)	Literature Survey (10 ECTS)
• Nonlinear Mechanics (4 ECTS)	
• Physics for Mechanical Engineers (4 ECTS)	
• Measurement Technology (3 ECTS)	
• 1 socially oriented course (3-6 ECTS)	
Compulsory courses for all students in the EFPT track (16 ECTS)	Research Assignment (15 ECTS)
• Advanced Heat Transfer (3 ECTS)	
• Advanced Fluid Dynamics (5 ECTS)	
• Advanced Applied Thermodynamics (5 ECTS)	
• Equipment for Heat and Mass Transfer (5 ECTS)	
• Attend a colloquium series (1 ECTS)	
Choose two	Thesis (35 ECTS)
• Process Plant Design (5 ECTS)	
• Modeling of Thermodynamic and Hydrodynamic Systems (5 ECTS)	
• Advanced Reaction and Separation Systems (5 ECTS)	
• Turbulence (5 ECTS)	
Elective courses (14-17 ECTS)*	

*See website and study guide for more information.

Process Technology

Process Technology faces tremendous challenges related to the shrinking availability of non-renewable resources, rising energy prices, and a range of environmental and safety issues. The Process Technology of the future must re-invent industrial processes as sustainable processes that use energy and resources efficiently while drastically reducing waste streams. EFPT students who focus on process technology learn to define, design and optimize the processes and equipment that transform raw goods into consumer products. Students receive the knowledge and skills they need to define, design and optimize sustainable processes and equipment. Students learn the state-of-the-art in process intensification, thermodynamics, fluid dynamics and process control and get hands-on experience in sustainable process technology.

Fluid Mechanics

EFPT students who focus on fluid mechanics receive training in the fundamentals of fluid flow. Particular attention is paid to turbulence and multi-phase flow, since these are relevant to many industrial and environmental applications. Much emphasis is placed on computational fluid dynamics (CFD) and its use in

solving various practical problems. Associated research activities at TU Delft concern the application of numerical tools to fluid mechanics, particularly with respect to the simulation of turbulence. Fluid mechanics cannot be done properly without experiments. For this reason, most of the numerical work is combined with experimental research emphasizing the use of new measurement techniques. Consequently, the student is trained in all aspects of modern fluid mechanics in both classroom and research environments.

Hands-on experience

Second year EFPT students complete an industrial internship and a research project. Internships can be completed in the Netherlands and abroad at companies like Shell, DSM, BASF, Tata Steel, Airbus, Stork Air and Akzo-Nobel, which also hire many of our graduates.

Graduation projects are completed on cutting edge research topics under the supervision of a TU Delft researcher. Sample topics include heat pump design and analysis, numerical modelling of combustion, solid oxide fuel cells, crystallisation in external fields, and ammonia/water absorption modeling.

 **75**
students per year

 **50%**
international MSc students

 **>90%**
do an internship at a company

 **<5**
students per staff member