

FItech Hydrogen

Study module
20–40 ECTS

FItech
NETWORK UNIVERSITY



What is the FITech Hydrogen study module?

Hydrogen plays an important role in the green transition from fossil fuels towards the production and use of renewable energy.

This study module brings together the educational offering from all technical universities in Finland. It consists of 20–40 ECTS of studies (one study credit (1 ECTS) means approximately 27 hours of studying). We recommend to start with the introductory course and then move to other courses of the module according to your interests. The module can be complemented with elective studies. Hydrogen Cluster Finland has participated in planning the content of the module. The courses will also include guest lecturers from companies.

The purpose of this study module is to give a holistic understanding of hydrogen economy and its value chain as well as related technical, economical and political questions.

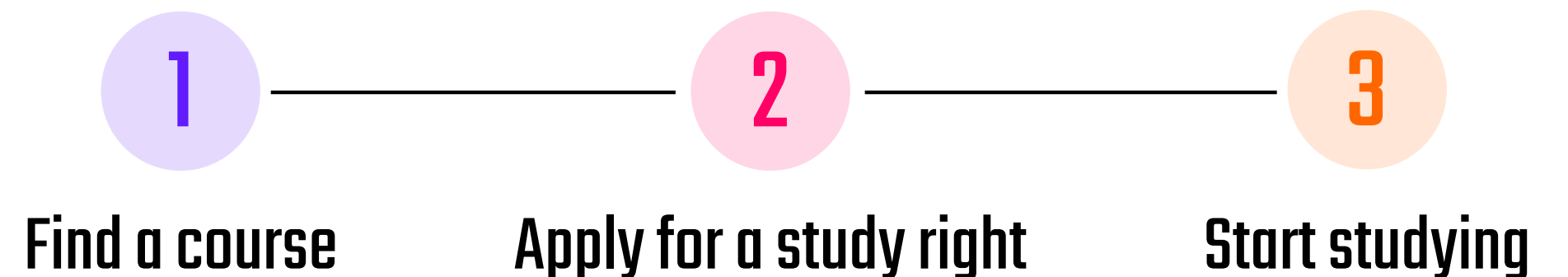
The study module considers hydrogen as a system and also as a part of the energy system. The use of hydrogen is investigated as a part of machines and energy generation, and also discussed from the perspective of different chemical products that are derivatives of hydrogen. To complete the picture, the life cycle analysis and the role of hydrogen in energy and geopolitics are also considered.

General information about the studies

- Detailed information about the courses, teaching schedules and application can be found on [FITech's website](#) starting on **15 December**. First courses will start in **January 2023**.
- Courses are organised in English and mainly online.
- You can apply for a study right with one form. You need to accept the study place you have been granted separately for each course. After this, you will receive instructions on the study practices of each university.

Where to start?

How to apply to FITech courses in a nutshell:



Start here

Introduction to hydrogen economy, 5 ECTS

Aalto University

Objectives

Providing general understanding about hydrogen economy and its value chain. Covering the integration of hydrogen economy to power and energy systems, the role of hydrogen in energy and power markets, the basics of hydrogen production, storing and utilisation, and the role of hydrogen derivatives.

Course content

- Power generation, transmission and use
- Power markets, power balance management
- Smart grids, sector coupling
- Energy storage systems
- Hydrogen production: basic chemistry and technical solutions
- Hydrogen storages and material questions, safety and legislation
- The use of hydrogen, hydrogen derivatives
- Life cycle analysis of hydrogen solutions
- Energy markets and global energy resources
- Energy politics, green transition and geopolitics

[Click here for more information and to apply.](#)

Next courses (no specific order)

Hydrogen as fuel in combustion engines, 5 ECTS

University of Vaasa

Objectives

The course is designed to provide students with knowhow and knowledge in the fundamentals of hydrogen as combustion engine fuel, of hydrogen-driven engines and gas turbines, and of the fuel system for hydrogen in marine and on-shore applications.

Course content

- Hydrogen as combustion engine fuel
- Hydrogen-driven engines and gas turbines
- Fuel system for hydrogen-driven power generation

[Click here for more information and to apply.](#)

Hydrogen production and storage, 5 ECTS

University of Oulu

Objectives

After the course, the student has a comprehensive understanding of hydrogen production technologies, knows why and how hydrogen is stored and what safety issues need to be considered.

Course content

- Hydrogen chemistry
- Hydrogen production and safety
- Different electrolyser technologies
- Digitalisation in hydrogen and P2X processes
- Hydrogen storage: systematic approach and new material solutions

This course has been designed and implemented jointly by the universities of Oulu, Jyväskylä, Tampere, Eastern Finland and LUT.

[Click here for more information and to apply.](#)

Fuel cells, moving working machines and transportation, hydrogen networks

5 ECTS

Tampere University

Objectives

After the course, the student has a comprehensive understanding on operation of fuel cells, hydrogen as a fuel in moving working machines and transportation (roads, marine, aviation), and structures and properties of hydrogen networks.

Course content

- Basics of fuel cells
- Electrification of moving working machines by means of hydrogen and other energy sources
- Hydrogen and e-fuels in powering of road transportation, marine, and aviation applications
- Safety issues in hydrogen transportation and utilisation
- Basics of hydrogen networks

This course has been designed and implemented jointly by the universities of Tampere, Oulu, Aalto and LUT.

[Click here for more information and to apply.](#)

Additional elective courses (up to 20 ECTS)

- [Advanced project-based management](#) (Åbo Akademi)
- The geopolitics of hydrogen (Tampere University)
- [Introduction to electrochemical energy storage and conversion technologies](#), [Electrochemical energy storage and conversion technologies](#) (LUT University)
- Hydrogen in metallurgy, Kiertotalouden ja kestävän kehityksen liiketoimintamallit ja ekosysteemit, minor studies in industrial engineering and management (University of Oulu)
- Project courses (University of Turku, University of Eastern Finland)
- Project management courses (Aalto University)
- Catalytic processes and materials in sustainable hydrogen production (University of Jyväskylä)

FITech Network University

- A network of Finnish universities of technology.
- Studies are free of charge and open for all Finns and permanent residents of Finland.
- The study offering has many online courses meant to be studied alongside work.
- Study themes are hydrogen economy, 5G, ICT, energy storages and other select fields of technology.
- Studies are a great opportunity to update personnel competence cost-efficiently.
- Read more on [FITech's website](https://fitech.io).
- Questions? Contact us at info@fitech.io.

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