



HYDROGEN TECHNOLOGY THEME ROUTE

(This information will soon be published on *OnderwijsOnline* and *Insite*)

Do you want to gain experience with an important building block in energy transition? Consider choosing the theme Hydrogen Technology several times during your study. After completing the route you'll receive a certificate.

What does the theme route involve?

As a student taking the Hydrogen Technology theme route, you'll work on hydrogen issues within your current study load. So the theme route does not involve any extra study load, but takes shape in the choices you make during your studies. Especially in the projects, your internship and your graduation project.

As a student, this theme route gives you the opportunity to gain experience during your study and to build up your own profile on a socially urgent theme that fits in with the HAN key area of Sustainable Energy & Environment (SEE)

Hydrogen Technology is the first theme route that will be available to students within the School of Engineering and Automotive.

Importance of hydrogen

In the transition to a sustainable energy provision, balancing energy supply and demand is a huge challenge. The use of renewable energy sources (mainly wind and solar) to generate energy creates a variable supply that does not always match the demand for energy. This issue is one of the biggest barriers to a sustainable energy system.

Globally, hydrogen is seen as a promising energy carrier that can contribute to solving this problem. After all, electricity can be stored temporarily by turning it into hydrogen.

Besides using hydrogen as a storage medium, hydrogen is also suitable as a sustainable fuel. The energy carrier is therefore attracting a great deal of attention around the world. Investments in hydrogen projects are increasing rapidly. Here in the Netherlands, new hydrogen initiatives are announced almost every week.

The Hydrogen Technology theme route focuses on hydrogen applications aimed at a sustainable, reliable and affordable energy supply, clean mobility and a sustainably built environment.

What is HAN doing in the field of hydrogen?

At the School of Engineering and Automotive, three research groups are active in the field of hydrogen technology: Automotive Research, Sustainable Energy and Control Systems Engineering. Automotive Research has over 15 years of experience in research into mobile applications of hydrogen technology. The Sustainable Energy research group has many years of experience in applied research into hydrogen technology in collaboration with industry. The Control Systems Engineering research group is mainly researching the role of hydrogen for the temporary storage of surplus solar and wind energy to support the local electricity network.

HAN also has special facilities for research and education on this theme, including the HAN H2Lab at Industry Park Kleefse Waard (IPKW).

What can students do with hydrogen technology?

This is your chance to develop expertise on hydrogen technology during your studies. This theme route offers focus and space to develop your own professional profile. Not to become an expert, but to gain experience with it. Experience both from your own study program and in collaboration with students from other study programs.

The use of hydrogen technology for energy transition requires contributions from several professions.

Students from all study programs can therefore work with hydrogen technology:

- As a mechanical engineer you can work with systems that produce, convert, use or store hydrogen. Like electrolyzers, fuel cells and gas storage tanks.
- As an electrician, you can work with power electronics and control systems for smart energy conversions.
- As an industrial product designer you can start making hydrogen technology usable, attractive and accepted.
- As an automotive engineer you can work with hydrogen vehicles, hybrid vehicles and hydrogen infrastructure.

When are you entitled to the certificate?

You are entitled to a certificate when you complete this theme route. It is issued by HAN, specifically its key area of Sustainable Energy & Environment (SEE), together with the companies participating in the theme route and the Dutch Hydrogen & Fuel Cell Association ([NWBA](#)).



For a certificate, you need to meet the following criteria:

- at least 65 credits on the hydrogen technology theme* from academic year 2019-2020, at least one multidisciplinary project. For students who made their project choice for semester 6 in December 2020/January 2021, but did not previously do a project or internship on the theme, a minimum of 55 instead of 65 credits applies.
- basic knowledge (workshop in combination with self-study)
- safety certificate ATEX 153 (subject to change)
- participation in at least three networking activities, where you once actively share the knowledge you gained in one or more projects.

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Of course, you don't have to do all this on your own. We offer the following support in the Hydrogen Technology theme route:

- workshop with self-study, so you acquire basic knowledge and can make a good start in your first hydrogen project or internship
- sources of knowledge and starting points for further search
- supervision by experts from the research groups in Sustainable Energy, Automotive Research and Control Systems Engineering, and/or from companies/clients
- H2 facilities to work on practical issues (hardware and software for applied research and projects), including the HAN H2Lab (hydrogen lab) at the IPKW
- networking activities with other professionals with a passion for hydrogen technology and the energy transition

With the certificate you can show that you are not only a good engineer, but that you also bring experience in working on applications of hydrogen technology.

How is the Hydrogen Technology theme route integrated into my study program?

For the certificate you need to work on the hydrogen technology theme for at least 65 credits. The diagrams below shows which units of study allow space for working on this theme.

Year 1	Year 2	Year 3	Year 4
s1	s3 Project 15 EC mono/multidisciplinary	s5 Internship 30 EC	s7
s2	s4 Project 15 EC mono/multidisciplinary	s6 Project 30 EC multidisciplinary	s8 Graduation Assignment 30 EC

Mechanical Engineering, Electrical and Electronic Engineering

Year 1	Year 2	Year 3	Year 4
s1	s3 Project 7,5 EC mono/multidisciplinary	s5 Internship 30 EC	s7
s2	s4 Project 10 EC mono/multidisciplinary	s6 Project 25 EC multidisciplinary	s8 Graduation Assignment 30 EC

Automotive Engineering

Jaar 1	Jaar 2	Jaar 3	Jaar 4
s1	s3 Project 20 EC mono/multidisciplinair	s5 Stage 30 EC	s7
s2	s4 Project 15 EC mono/multidisciplinair	s6 Project 30 EC multidisciplinair	s8 Afstuderen 30 EC

Industrial Product Design

What should I do if I'm interested in the theme route?

You don't have to sign up anywhere for the theme route. And you don't have to decide right now whether you want to go for the certificate. You can simply choose a project on the theme of hydrogen technology and start with the theme. That way you can gain experience with the theme. If you want, you work towards the certificate in the choices you make after that. But after the initial experience, you can also decide to make other choices and gain other experiences.

Questions? Send an email to see@han.nl and we'll contact you.

The theme route Hydrogen Engineering was made possible in part by [SEECE](#), the Center of Expertise for sustainable, reliable and affordable electrical energy supply.

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