TeachHy
Teaching Fuel Cell and Hydrogen Science and Engineering Across Europe within Horizon 2020
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Project Overview

**Call year:** 2017

**Call topic:**
FCH-04-3-2017

European Higher Training Network in Fuel Cells and Hydrogen

**Project dates:**
11/2017 - 10/2022

**Total project budget:**
1,448,529 €

**% stage of implementation:**
100%

**TeacHy**

Clean Hydrogen Partnership max. contribution: 1,248,529 €
Other financial contribution: 200,000€ (EIT-KIC and UoB)
Partners

[Map showing various European institutions and logos, including ULB, TUDelft, Technical University of Denmark (DTU), KIT, University of Chemistry and Technology Prague, University of Birmingham, EPFL, Grenoble INP, Clean Hydrogen Partnership, and Co-funded by the European Union logos.]
Synergies With Other Projects And Programmes

**CDT**
EPSRC, 2013-22 - PhD training programme
**action:** use of module material and LMS structure

**TrainHy**
FCH JU, 2010-12 - JESS Summer School, curriculum
**action:** use of curriculum in TeachHy programme development

**KnowHy**
FCH JU, 2013-17 - Level 6 blended learning CPD courses
**action:** know-how and experience with blended learning CPD modules used in TeachHy

**KICStartH2**
EIT-KIC InnoEnergy, 2022-24 - 4 modules in H2 topics for university & CPD use
**action:** alignment of 2x (3x) module content with TeachHy

**JESS**
private funding (UoB, DTU, FZJ) - platform for PhD and CPD training
**action:** alignment of 2x module content with TeachHy
• there is a complete lack of specialised university degrees in FCH technologies
• on the other hand, ~50,000 engineers will be required in the industry by 2030
• TeachHy has built a ‘blended’ approach in which 20 to 40% of teaching content occurs in face2face teaching and the remainder is offered online
• project is still ‘ahead of the curve’ in responding to increasing demand for education and training in FCH technologies and in online education
• modules can be picked and mixed according to specialisation and/or orientation:
  * basic sciences, practical lab work, applied topics
  * can include compulsory and optional modules
• large degree of freedom to shape courses
• courses can be built for 12, 18 or 24 months
• student workload can be adapted to university expectations for credit points (additional reading, amount of coursework)

- courses may differ considerably across partners

Project Methodology

MSc Course [Module m] [Module m] [Module m+1] [Module m+2] [Module m+x]

20% locally taught
65% e-learning
15% off-site face-to-face modules

local exam
## MSc Programme Structure

<table>
<thead>
<tr>
<th>Introductory modules (15 ECTS)</th>
<th>Core modules (20 to 25 ECTS)</th>
<th>Optional modules (20 to 25 ECTS)</th>
<th>Research Project 30 ECTS</th>
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</thead>
<tbody>
<tr>
<td><strong>Fuel Cells</strong></td>
<td><strong>Core modules</strong></td>
<td><strong>Optional modules</strong></td>
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<tr>
<td>Hydrogen</td>
<td>Modelling</td>
<td>Low / High Temperature Fuel</td>
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<td>Low temperature technology (PEFC, AFC, DMFC)</td>
<td>Characterisation</td>
<td>Cells</td>
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<td>Hydrogen &amp; Hydrogen-Based Fuels</td>
<td>FCH Lab</td>
<td>Fuel Cell Systems</td>
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<td>Hydrogen Safety (10 ECTS, Ulster)</td>
<td>Energy Storage</td>
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<td>or</td>
<td>Renewable Energy Systems</td>
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<td></td>
<td>Hydrogen Safety (5 ECTS, UoB)</td>
<td>Hydrogen Policies and Standards</td>
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<td>Fuel Cell Systems, energy</td>
<td>Advanced Electrochemical</td>
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<td>systems and storage</td>
<td>Applications</td>
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<td>Electrolysers</td>
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<td>Hydrogen Infrastructure</td>
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<td>Fuel Cell Electric Vehicles</td>
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<td>Innovation Management and</td>
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<td>Business Development</td>
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**Research Project 30 ECTS**

- Low / High Temperature Fuel Cells
- Fuel Cell Systems
- Energy Storage
- Renewable Energy Systems
- Hydrogen Policies and Standards
- Advanced Electrochemical Applications
- Electrolysers
- Hydrogen Infrastructure
- Fuel Cell Electric Vehicles
- Innovation Management and Business Development
Project Status

- third cohort currently studying in Birmingham
- 16 modules implemented and in operation, 4 more in preparation (electrolysis, H2 infrastructure, innovation management, e-fuels)
- complete programme successfully transferred to UCTP / VSCHT, start date 2024/25
- all MSc modules have been registered for CPD use
- working with KICStartH2 and its partners to upgrade and implement modules
- TeacHy partner POLITO has established a H2-themed MSc programme with a.o. Universities of Catalunya and Eindhoven
Lessons Learnt

• reluctance of universities to take over external materials due to issues of
  * ownership of teaching material (copyright)
  * stewardship of teaching material (who ‘delivers’ it locally)
  * lack of dedicated lab space
  * setting of exam papers

• universities will have their own LMS and need to use this (instead of using a centralised server)
  * this creates issues of transferrability

• partner universities will have to have a licence for
  * course content, and for
  * access to LMS
  * but are not inclined to pay licence fees
Lessons Learnt

- languages - translate:
  * captions only / captions and audio / captions, audio, and slides
  * learners outside the UK have issues with accents
- differences in national and individual university regulations on accreditation, degrees, exams etc. require adjustments
- a favourable balance has to be held between online and in-person content
- tutorials are extremely important to participants / students
- a blended module / course for students looks different from a CPD course in the way of
  * tutorials
  * length
  * assessment
Future Plans & Impact

**Future Plans**

HyAcademy.EU

- expansion of activities to a network of 100 universities, 500 schools, and 5 teaching labs
- supply of 12 open access textbooks for teaching and studying
- online platform to give access to educational resources, incl. detailed information on degrees and qualifications available
- train-the-trainer and teach-the-teacher courses

**Impact**

Project achievements

- 12 universities using TeachHy materials across Europe
- growing network of institutions working together in university and vocational training (TeachHy, KnowHy and KICStartH2 consortia, adding H2Academy.EU in the future)
- better understanding of requirements of blended teaching and upskilling
Thank you for your attention!
Any questions?

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