

Electrochemical energy storage and Power2X

Subject area: Chemical Engineering

University:	DTU
Level:	BA all years
Teaching mode:	hybrid: some students participate online, other students attend real-life
Instructor(s):	Christodoulos Chatzichristodoulou, Peter Holtappels

Short description

The course introduces fundamental elements of electrochemistry and the principles of operation of electrochemical energy conversion and storage technologies. Main Power2X concepts that can bring renewable electricity into the production of sustainable fuels and chemicals are introduced as well, including processes such as Fischer-Tropsch and Haber-Bosch. This will form the basis for the students to explore advanced ways of integration of such technologies into a sustainable energy system.

Full description

<https://kurser.dtu.dk/course/47211>

Learning outcomes

A student who has met the objectives of the course will be able to:

Explain and utilize basic concepts of electrochemistry and electrochemical kinetics

Explain the physical and chemical principles of different electrochemical energy storage and conversion technologies

Calculate the energy content, power capability and energy losses of electrochemical energy conversion and storage devices

Design and implement a quantitative description of key operative and techno-economic characteristics of an energy conversion and storage device

Describe main production routes for sustainable fuels and chemicals

Access publicly available digital databases and implement data-driven methods to analyze needs and requirements of sustainable energy systems

Design a sustainable energy system by integrating the right type and scale of electrochemical energy conversion and storage technologies

Analyze and compare different system integration scenarios in terms of energy efficiency and cost

Organize and execute group-based project work

Communicate technical subjects both orally and in writing

Evaluate a scientific presentation and give constructive feedback to peers

General information

Contact hours per week:	4
Total workload:	140 (in student hours for the whole course)
ECTS credits:	5
Language:	English
Course start date:	01 September 2022
Course end date:	02 December 2022
Add. info about start date:	
Weekly teaching day/time:	Thursdays 8:00-12:00 CET
Time zone:	CET (Denmark, Germany, France, Netherlands, Switzerland, Czech Republic)
Further information:	Supplementary registration period in case of remaining vacancies: 22/8/2022 - 7/9/2022
Prerequisites:	Basic knowledge of chemistry and physics
Activities and methods:	Lectures, Group work, Self-study, Exercises
Presence on campus:	

Final examination

Form:	3 assignments, 1 project report, and a written quiz
Date:	01 December 2022
Location/format:	online
Re-sit possibility:	
Transcript available:	end of semester
Add. info/requirements:	

Registration

To register for this course, follow the registration requirements of your **home university** as specified here: www.euroteq.eu/courses-registration.

Administration

Number of places:

Minimum participants: 10

Internal course code: 47211

Contact: ccha@dtu.dk

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