Courses in English
Course Description

Department
04 Electrical Engineering and Information Technology

Course title
Batteries and Fuel Cells

Hours per week (SWS)
3

Number of ECTS credits
5

Course objective
• Technological overview of fuel cells, their classification and different properties.
  Requirements for operation, factors influencing power density, efficiency and costs.
• Technological overview of modern and future battery systems, especially high-temperature batteries (NaS, NaNiCl2) and redox flow batteries (vanadium systems and alternatives).
• In-depth study of the topic of lithium batteries, particularly with regard to future trends (5V materials, lithium sulphur, lithium-air).
• Modern electrotechnical analysis methods for batteries and fuel cells, especially the electrochemical impedance spectroscopy and models derived from it. Development of equivalent circuit models and their parameterization via measurements.
• Modern model-based methods for determining the condition of batteries and fuel cells.
• Deepening of the understanding of fuel cells and batteries as well as their analysis methods and modeling through three laboratory practicals

Prerequisites
Recommended: Basic knowledge of electrical energy storage

Recommended reading
Jossen, A. & Weydanz, W. Moderne Akkumulatoren richtig einsetzen, Inge Reichardt Verlag, 2006

Teaching methods
Seminar-based instruction with integrated exercises/integrated internship

Assessment methods
Written exam, 90 min

Language of instruction
English

Name of lecturer
Prof. Dr. Oliver Bohlen

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Link
https://www.ee.hm.edu/fk04/profs/bohlen.de.html

Course content
See handbook for the master program "Elektrotechnik",
https://www.ee.hm.edu/studium_allgemein/modulhandbuecher/modulhandbuecher_1.de.html

Remarks