UPPSALA
UNIVERSITET

Batteries for Electromobility 7.5 credits

Syllabus, Bachelor's level, 1KB276
Valid from Autumn 2022

Code
1KB276

Education cycle
First cycle

Main field(s) of study and in-depth level
Chemistry G1N, Technology G1N

Grading system
Pass with distinction (5), Pass with credit (4), Pass (3), Fail (U)

Finalised by
The Faculty Board of Science and Technology, 4 March 2021

Responsible department
Department of Chemistry - Ångström

Entry requirements

General entry requirements and Physics 2, Chemistry 1, Mathematics 3c/ Mathematics D

Learning outcomes

On completion of the course the student shall be able to:

- explain the function of a battery, its components and fundamental electrochemical processes,
- describe the most common battery systems and their role in the energy system as well as consumer products,
- describe the specific challenges related to batteries for electromobility,
- calculate the energy density of batteries, interpret charge/discharge curves of the most common rechargeable battery types and interpret concepts that describe battery performance (SOC, SOH, etc.),
- describe production processes for batteries for electromobility,
- interpret simple simulation models for how load and vehicle behavior affect the performance and aging of batteries,
- discuss issues related to safety, cost and the environment in relation to

vehicle batteries.

Content

Basic electrochemistry and materials chemistry. Primary and secondary batteries and their role in the energy system. Different battery compositions and processes in batteries. Concepts that describe batteries' storage capabilities in terms of power and energy. Lithium ion batteries: materials and components. Production of batteries for electromobility. Next generation batteries. Battery diagnostics and modelling of batteries. Battery ageing. Use of batteries in different types of electric vehicles. Safety, cost and environmental aspects regarding vehicle batteries.

Instruction

Lectures and seminars by distance.

Assessment

Written assignments during the course (5 credits), seminars with associated assignments (2.5 credits).
If there are special reasons for doing so, an examiner may make an exception from the method of assessment indicated and allow a student to be assessed by another method. An example of special reasons might be a certificate regarding special pedagogical support from the disability coordinator of the university.