

Energy Storage Technologies

Course Workload		Assessment form (examination/ graded test/ ungraded test)
ECTS	Hours	
6	216	Exam

The course covers modern energy storage and conversion technologies, including electrochemical systems (batteries, fuel cells, redox-flow batteries), organic and inorganic semiconductors, and renewable energy sources. Students will explore working principles, materials, analysis methods, and future perspectives of energy technologies.

Course structure:

1. Fundamentals of energy technologies

- 1.1. Introduction to energy storage technologies
- 1.2. Basic laws of thermodynamics and electrochemistry
- 1.3. Energy sources and their classification

2. Electrochemical systems

- 2.1. Lithium-ion batteries: principles and materials
- 2.2. Redox-flow batteries: structures and applications
- 2.3. Fuel cells and hydrogen energy

3. Organic and inorganic semiconductors

- 3.1. Organic semiconductors: properties and applications
- 3.2. Perovskite solar cells
- 3.3. Nanotechnologies for energy

4. Emerging energy technologies

- 4.1. Sodium-ion batteries: fundamentals and perspectives
- 4.2. Organic materials for photoelectric systems