Module Name	Methods and System Concepts for Innovative Energy Storage Applications
Module Number	EuI-RES-E-MSKES
Responsible Lecturer	Prof. Dr.-Ing. T. Bocklisch thilo.bocklisch@tu-dresden.de
Qualification Objectives	Students master advanced functional principles of electrical, mechanical, electrochemical, and thermal energy storage systems and are able to select appropriate energy storage technologies in combination with other flexibility technologies for various application fields. Students understand the importance of cross-sectoral energy use and master basic principles, coupling types, as well as dimensioning and operational management methods for simple and hybrid energy storage systems in stationary, mobile, and portable applications. They possess knowledge about the innovation potential of individual energy storage technologies regarding the further development of storage and conversion components, the methods used for subordinate control, application-specific operational management, and system-technical energy supply and coupling structures.
Contents	The module covers methods and system concepts for storage demand analysis, storage integration, and storage coupling in sustainable energy supply structures based on a high share of renewable energies across the sectors of electricity, heat, transport, and chemical raw materials. The module includes principles, dimensioning, and operational management methods for hybrid systems and hybrid energy storage systems in selected autonomous, grid-connected, and mobile applications. Furthermore, the module conveys innovation potentials with regard to the further development of storage technologies at the material and component levels, the use of modern methods for plant operation, and the consideration of system-technical and system-analytical challenges in various application fields.
Teaching and Learning Forms	4 hours per week of lectures, 2 hours per week of exercises, and self-study.
Prerequisites for Participation	The competencies to be acquired in the module "Fundamentals of Energy Storage" are required.
Usability	The module is an elective module from the elective area "Competence Deepening" according to § 6 paragraph 3 SO and § 33 paragraph 3 PO in the main study phase of the diploma program "Renewable Energy Systems."
Prerequisites for the Award of Credit Points	Credit points are awarded when the module examination is passed. The module examination consists of a written exam lasting 180 minutes. If fewer than 20 participants register for the exam, the written exam will be replaced by a non-public oral group examination lasting 30 minutes. This will be announced to the registered students at the end of the registration period in the usual manner.
Credit Points and Grades	7 credit points can be earned through the module. The module grade corresponds to the grade of the examination performance.
Frequency of the Module	The module is offered every winter semester.
Workload	The total workload is 210 hours.
Duration of the Module	The module lasts one semester.