Module Name	Chemistry for Renewable Energy Systems
Module Number	EuI-RES-E-CHM
Responsible Lecturer	Prof. Cornelia Breitkopf cornelia.breitkopf@tu-dresden.de
Qualification Objectives	Students are familiar with chemical terminology and understand the periodic table of elements, the various types of chemical bonds, the fundamentals of spectroscopic measurement methods, material models for different states of matter, and the basics of electrochemistry. They can apply this knowledge to chemical problems. Chemical reactions can be fundamentally analyzed in terms of their kinetics and thermodynamics. Students understand the phase behavior of pure substances and mixtures and are familiar with technically relevant applications of the methods and substances learned. They recognize the necessity of energy-saving circular processes and can classify these within the three pillars of sustainability, evaluating projects economically, ecologically, socially, and with gender equity in mind.
Contents	The module covers the periodic table of elements, the three types of chemical bonds, the fundamentals of spectroscopic material characterization, and the various states of matter and their models, such as ideal gas, real gas, liquids, and solids. Chemical reactions are addressed with regard to their stoichiometry, kinetics, thermodynamics, and chemical equilibrium. Applications specific to engineering, such as combustion, corrosion, lubricants, composite materials, and polymers, are introduced, explained, and explored in depth using technically relevant topics, such as the Fe3C diagram. Fundamentals of electrochemistry are also covered. Aspects of energy-saving circular economy processes are taught, considering the three pillars of sustainability: economic, ecological, and social, including gender equity.
Teaching and Learning Forms	2 hours per week of lectures, 2 hours per week of exercises, 1 hour per week of tutorials, and self-study.
Prerequisites for Participation	Knowledge of mathematics, physics, and chemistry at the basic high school level is required.
Usability	The module is an elective module in the elective area "Orientation" according to § 6 paragraph 3 SO and § 33 paragraph 3 PO in the main study phase of the diploma program Renewable Energy Systems. It creates the prerequisites for the modules that list this module in the field "Prerequisites for Participation."
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 90 minutes. A bonus for the written exam can be earned by completing e-assessments with a workload of 10 hours.
Credit Points and Grades	5 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 summer semester.
Workload	The total workload is 150 hours.
Duration of the Module	The module lasts one semester.