

Module Name	Methods of Control Engineering
Module Number	Eul-RES-E-RTM
Responsible Lecturer	Prof. Dr.-Ing. habil. Klaus Röbenack klaus.roebenack@tu-dresden.de
Qualification Objectives	After completing the module, students are able to systematically describe linear control loops in the state space as well as design state feedback controllers and state observers. They are familiar with the stability concept according to Lyapunov and can verify the stability of equilibrium points of nonlinear systems. Furthermore, they are capable of designing nonlinear controllers and control systems for selected classes of systems in energy technology and mechanical engineering.
Contents	The module covers the state-space representation of linear dynamic systems, the design of state feedback controllers and state observers, stability verification using Lyapunov's direct and indirect methods, and methods for designing nonlinear controllers for application-oriented classes of nonlinear systems. Examples include sliding mode controllers and controller design using exact input-output linearization for systems in energy technology and mechanical engineering.
Teaching and Learning Forms	2 hours per week of lectures, 1 hour per week of exercises, 1 hour per week of practical lab courses, and self-study.
Prerequisites for Participation	The competencies to be acquired in the module "Control Engineering" in the diploma program Renewable Energy Systems are required.
Usability	The module is an elective module in the elective area "Competence Deepening" according to § 6 paragraph 3 of the Study Regulations (SO) and § 33 paragraph 3 of the Examination Regulations (PO) in the main study phase of the diploma program Regenerative 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 120 minutes and a portfolio with a workload of 20 hours.
Credit Points and Grades	5 credit points can be earned through the module. The module grade is determined by the weighted average of the grades of the examination components. The written exam is weighted threefold, and the portfolio is weighted singly.
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.