

Module Name	Nonlinear Control Engineering
Module Number	Eul-ET-C-NLR
Responsible Lecturer	Prof. Dr.-Ing. habil. Klaus Röbenack klaus.roebenack@tu-dresden.de
Qualification Objectives	After completing the module, students are able to analyze the fundamental dynamic properties of selected classes of nonlinear systems. They are familiar with the Lyapunov stability concept for nonlinear systems and can verify the stability of equilibrium points of nonlinear systems. Students can design controllers and regulators for selected classes of single-input nonlinear systems and are capable of solving simple problems in nonlinear control systems using computer-based tools.
Contents	The module covers: - Analysis of nonlinear systems, for example, in the state space and using the harmonic balance method, - Direct and indirect Lyapunov methods, - Methods for designing nonlinear controllers for specific classes of single-input nonlinear systems, such as sliding mode controllers or controllers designed using exact input-output linearization, - Knowledge transfer for solving selected problems in nonlinear control systems using computer algebra and simulation systems.
Teaching and Learning Forms	2 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 "Control Engineering" are required.
Usability	The module is a compulsory module in the main study program of the specialization Automation Technology and Robotics in the diploma program Electrical Engineering. 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 120 minutes.
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.