

Module Name	Control Systems
Module Number	Eul-ET-C-RT
Responsible Lecturer	Prof. Dr.-Ing. habil. Klaus Röbenack klaus.roebenack@tu-dresden.de
Qualification Objectives	After completing the module, students are able to mathematically describe linear time-continuous systems in the time and frequency domain and understand the basic structure of control systems and controllers. They can analyze the stability of linear time-continuous systems and control loops in the time and frequency domain. Students are familiar with the concepts of controllability and observability and can verify these properties for given systems. They are capable of systematically designing single-loop linear control loops in the time and frequency domain as well as state feedback controllers and state observers. Furthermore, they can describe time-discrete control systems in the time and frequency domain, prove their stability, and design controllers for these systems.
Contents	The module covers: • Description of linear time-continuous systems and control loops using transfer functions and state-space representation, • basic tools for stability analysis of time-continuous systems in transfer function and state-space representation, • criteria for controllability and observability, • design of fixed-structure controllers, such as PID controllers, as well as state feedback controllers and state observers, and • control of time-discrete systems.
Teaching and Learning Forms	3 hours per week of lectures, 2 hours per week of exercises, and self-study.
Prerequisites for Participation	The competencies to be acquired in the modules System Theory and Automation Engineering are required.
Usability	The module is a compulsory module of the main study program in the field of Automation 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 150 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 winter semester.
Workload	The total workload is 150 hours.
Duration of the Module	The module lasts one semester.