

Module Name	Control Engineering Basics
Module Number	Eul-MT-C-RTB, Eul-ET-E-RTB, Eul-IST-E-RTB
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 domains and understand the basic structure of control and regulation systems. They can analyze the stability of linear time-continuous systems and control loops in the time and frequency domains. 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 domains as well as state feedback controllers and state observers.
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 - Controllability and observability criteria - Design of fixed-structure controllers, such as PID controllers, as well as state feedback controllers and state observers
Teaching and Learning Forms	2 hours per week of lectures, 2 hours 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 modules Systems Theory and Automation Engineering are required.
Usability	The module is one of three elective modules in the field of Electrical Power Engineering in the diploma program Electrical Engineering, of which one must be chosen. Furthermore, it is an elective module in the elective area Orientation according to § 6 paragraph 3 SO and § 33 paragraph 3 PO of the main study program in the diploma program Information Systems Engineering. Additionally, it is a compulsory module in the main study program of the diploma program Mechatronics. 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 and a portfolio with a workload of 20 hours. Both examination components are relevant for passing.
Credit Points and Grades	5 credit points can be earned through the module. The module grade is calculated as the weighted average of the grades of the examination components. The written exam is weighted fourfold, and the portfolio is weighted singly.
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.