

Module Name	New, Smart, and Soft Actuators and Actuator Systems
Module Number	Eul-ET-E-NAAkS
Responsible Lecturer	Prof. Dr.-Ing. Andreas Richter andreas.richter7@tu-dresden.de
Qualification Objectives	After completing the module, students are able to select suitable actuator principles for specific tasks, define the interfaces necessary for system implementation, and appropriately dimension the actuator elements. They recognize the particular physical conditions of fluid movement in microstructures and can apply technologies and analysis methods for microfluidic systems.
Contents	The module covers unconventional actuators, including the systematics of actuator effects, physical principles of these effects, functional principles, design and dimensioning guidelines, application examples, and relevant fields of application such as haptics and robotics. Additionally, it includes microfluidics with fluid properties, fluid dynamics, fluid manipulation phenomena, basic elements and operations, platform technologies, and analytical methods.
Teaching and Learning Forms	4 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 modules "Materials" and "Microelectronic Technologies and Components" are required.
Usability	The module is an elective module from the elective area "Competence Deepening" according to § 6 Paragraph 3 SO and § 33 Paragraph 4 PO of the main study program in the field of Microelectronics 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 90 minutes and a portfolio with a workload of 60 hours. For up to 15 registered students, the written exam is replaced by a non-public oral examination as an individual exam lasting 30 minutes. If applicable, this will be announced to the registered students at the end of the registration period in the usual manner.
Credit Points and Grades	7 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 or oral examination is weighted twice, and the portfolio is weighted once.
Frequency of the Module	The module is offered every winter semester.
Workload	The total workload is 210 hours.
Duration of the Module	The module lasts one semester.