

Module Name	Medical and Miniature Robotics
Module Number	Eul-ET-E-MeMiR, Eul-MT-E-MeMiR
Responsible Lecturer	Prof. Dr.-Ing. Andreas Richter andreas.richter7@tu-dresden.de
Qualification Objectives	After completing the module, students are able to select suitable functional principles for specific robotic tasks in medicine and at small scales, define the interfaces necessary for system implementation, and design robotic structures using simulation tools. Additionally, they can conceptualize the technologies required for manufacturing robotic structures.
Contents	The module covers medical and miniature robots at the nano-, micro-, and small macro-scale, including materials, effectors, and actuation concepts, their physical principles, functional principles, design and dimensioning guidelines, manufacturing technologies, and relevant application fields with a focus on medicine as well as current research trends. Furthermore, the behavior of robotic structures is predicted through simulation-based design using various simulators. A particular focus is placed on soft robotic structures.
Teaching and Learning Forms	3 hours per week of lectures, 2 hours per week of seminars, 1 hour per week of practical lab courses, and self-study.
Prerequisites for Participation	The competencies to be acquired in the module "Materials" are required.
Usability	The module is an elective module in 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. Furthermore, it is an elective module in the elective area "Methods and Applications" according to § 6 paragraph 3 SO and § 33 paragraph 3 PO of the main study program in 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 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. Here, the written exam or oral examination is weighted twice, and the portfolio is weighted once.
Frequency of the Module	The module is offered every summer semester.
Workload	The total workload is 210 hours.
Duration of the Module	The module lasts one semester.