

Module Name	Autonomous and Cooperative Systems in Biomedical Engineering
Module Number	Eul-ET-E-AKoSy
Responsible Lecturer	Prof. Dr.-Ing. habil. Hagen Malberg lehre.ibmt@tu-dresden.de
Qualification Objectives	After completing the module, students possess knowledge, skills, and competencies in handling autonomous and cooperative systems in medicine. They are familiar with the functional principles and methodological tools for the development of such systems.
Contents	The module covers networked and intelligent implants, including an introduction to implant technology, functional implants, integrated sensor technology, and clinical applications. It also includes generalization of measurement, automation, and analysis tasks, as well as the design and development of intelligent and networked implants, including energy supply, biocompatible assembly and interconnection technology, and interfaces. Furthermore, the module addresses cardiac assistance systems, including therapy concepts, functionality, pacemaker codes, design and application of pacemakers and defibrillators, frequency-adaptive systems, telemonitoring, and safety. Biomechanical systems in rehabilitation are also covered, including an introduction to posture and motion analysis, biomechanical measurement methods, instrumental gait analysis, and therapy concepts for prostheses, orthoses, and exoskeletons.
Teaching and Learning Forms	4 hours per week of lectures, 1 hour 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 modules Physics and Biomedical Engineering 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 specialization Devices, Micro-, and Medical Technology 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 complex assignment with a workload of 30 hours.
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 is weighted three times, and the complex assignment 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.