

Module name	Digital Medical Technology
Module number	Eul-BMT-C-DMT
Lecturer in charge	Prof. Dr.-Ing. habil. Hagen Malberg Lehre.IBMT@tu-dresden.de
Objectives	After completing the module, students will have the knowledge, skills and abilities to use modern medical diagnostic systems. They know the functional principles and methodological tools for developing such systems. In addition, students know and understand the basic structures, concepts and algorithms of machine learning and deep learning as well as their typical areas of application. They will be able to design, train and validate artificial neural networks for specific problems using the latest software.
Contents	The contents of the module are biosignals and monitoring as well as an introduction to machine learning. The focus on biosignals and monitoring covers in particular the recording of body signals, including bioelectrical, biophysical, auxiliary energy and its properties, measurement methods for lung diagnostics, orthopaedics, sensory organs; clinical laboratory and analysis measurement technology, contactless medical measurement methods, telemedicine and mobile diagnostic systems. The focus on introduction to machine learning includes an overview of basic structures, concepts and algorithms of machine learning and deep learning, including application-related design, classification and training methods. This covers in particular the discussion of typical and current problems and application areas of machine learning and their critical evaluation as well as practical experience in the design and training of artificial neural networks for various application areas using current software libraries.
Modes of teaching and learning	4 hours per week lectures, 2 hours per week exercises and self-study.
Prerequisites	The knowledge acquired in the modules Fundamentals of Biomedical Engineering and Systems Theory are required. Basic knowledge of linear algebra and analysis as well as basic programming skills are required, which can be acquired in the modules Introduction to Analysis and Algebra, Multidimensional Differential and Integral Calculus and Software Engineering Basics .
Usability	The module is a compulsory module in the main studies of the degree programme Biomedical Engineering. It creates the prerequisites for the modules that list that module in the "Prerequisites" field.
Requirements for the award of credit points	The credit points are awarded when the module assessment is passed. The module assessment consists of a portfolio of 45 hours.

Credit points and grades	7 credit points can be obtained by the module. The module grade is the grade of the examination.
Frequency	The module is offered every summer semester.
Workload	The total effort is 210 hours.
Duration	The module takes one semester.