Module Name	Modelling and Simulation of Physiological Processes
Module Number	EuI-BMT-E-MSPP
Responsible Lecturer	Prof. Dr. Stephan Speier stephan.speier@tu-dresden.de
Qualification Objectives	Students are able to model various physiological processes and regulatory mechanisms using mathematical approaches. The practical numerical implementation of the theoretical models enables students to simulate and analyze the dynamics of physiological systems.
Contents	The module covers the analysis of complex physiological processes using mathematical models and simulations, fundamental physico-chemical processes and their mathematical modelling, and their application to physiological processes and regulatory mechanisms such as biochemical reactions, metabolic processes, and circulatory system models. Additional topics include numerical implementation in Python and Bayesian data analysis to integrate experimental data with mathematical models in a logically consistent manner, aiming at parameter estimation and model selection.
Teaching and Learning Forms	2 hours per week of lectures, 2 hours per week of practical lab courses, and self-study.
Prerequisites for Participation	The competencies to be acquired in the modules Introduction to Analysis and Algebra and Software Engineering Basics are required.
Usability	The module is an elective module from the elective area "Medical-Economic Specialization" according to § 6 paragraph 3 SO and § 33 paragraph 3 PO of the main study program in the diploma program Biomedical Engineering.
Prerequisites for the Award of Credit Points	Credit points are awarded when the module examination is passed. The module examination consists of a complex assignment with a workload of 32 hours.
Credit Points and Grades	5 credit points can be earned through the module. The module grade corresponds to the grade of the examination performance.
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.