Module name	**Modelling and simulation in Biology**
Module number	CMS-TRK-MOS
Senior Lecturer	Prof. Dr. Ivo Sbalzarini ivo.sbalzarini@tu-dresden.de
Qualification objectives	Students master the modelling and simulation of biological systems in space and time. They shall be capable of independently deriving biological process models, formulating them mathematically and simulating them numerically on the computer. They can design and implement the relevant simulation codes independently.
Contents	The content of the module includes model scaling, dimension analysis, storage and flow modelling method for dynamic systems, control volume method for spatial system modelling, vector analytics, conservative fields, finite difference simulation of temporal systems, particle methods for simulation of spatial systems, applications in diffusion, reaction diffusion, advection diffusion, and flows and currents.
Forms of teaching and learning	The module includes lectures of 2 SWS, exercises of 2 SWS and self-study. The language of the lectures and exercises will be English.
Eligibility for participation	Knowledge of physics at the proficiency level of abitur, programming skills in a computer language, such as python, and knowledge of analysis and vector analysis at the bachelor's level are required.
Usability	The module is a compulsory module in the Computational Modeling and Simulation Masters Course in Track Computational Life Science. The module provides the pre-requisites for the modules it designates under the pre-requisites for participation.
Conditions for the award of credits	Credits are awarded when the module test is passed. The module test consists of a 120-minute away day. The language of the test will be English.
Credits and marks	The module allows 5 credit points to be obtained. The module score corresponds to the test performance score.
Frequency of the module	The module is offered every summer semester.
Workload	The total workload is 150 hours.
Duration of the module	The module covers 1 semester.