Module name	**Introduction to Mathematical Biology I: Discrete Models**
Module number	CMS-TRK-IMB1
Senior Lecturer	Prof. Dr. Andreas Deutsch andreas.deutsch@tu-dresden.de
Qualification objectives	Students are able to create discrete, stochastic and mathematical models for biological issues, analyse biomathematical problems, identify analytical and numerical solutions and apply the models in practice.
Contents	The content of the module includes discrete models such as cellular machines, stochastic processes, as well as morant models and biological applications such as collective cell migration, biological pattern formation, and tumour invasion and progression. Other contents include metrological analysis of discrete models, in particular Meanfield approximations and linear stability analysis.
Forms of teaching and learning	The module includes lectures of 2 SWS, exercises of 1 SWS and self-study. The language of the lectures and exercises will be English.
Eligibility for participation	Bachelor-level knowledge of mathematics and physics is required.
Usability	In the Masters Course Computational Modeling and Simulation, the module is a compulsory voting module in the Track Computational Mathematics, to be selected in accordance with Annex 2 to the Specific Examination Regulations. The module cannot be chosen in the Master's Course Computational Modeling and Simulation if this or a module with substantially the same content from a Course with which the entry conditions under § 3 of the Studienordnung have been met has already been completed. 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 non-public oral test performance as an individual test lasting 15 minutes. 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 winter semester.
Workload	The total workload is 150 hours.
Duration of the module	The module covers 1 semester.
Module name	**Numerical methods for partial differential Equations — Advanced concepts**

Module number	CMS-TRK-MA29
Senior Lecturer	Director of the Institute of Numerical Mathematics id.numerik@tu-dresden.de
Qualification objectives	Students have a systematic understanding of basic models, are able to adapt discretisation techniques to specific models, and have a clear idea of recent developments and current issues of the numeric nature of partial differential equations. They are able to analyse specific problems independently and to treat them numerically using the techniques provided, and are aware of the perspectives and limitations of the methods treated in terms of efficiency and accuracy.
Contents	The module includes advanced concepts for the analytical and numerical treatment of problems with partial differential equations, e.g. analysis and numerics of model-adapted discretisation techniques and theory and numerics of optimal control problems.
Forms of teaching and learning	The module includes lectures of 3 SWS, exercises of 1 SWS and self-study. The teaching language of lectures and exercises may be German or English and will be specifically determined by the teacher at the beginning of each semester and announced in the usual manner.
Eligibility for participation	The competences to be acquired in the module CMS-TRK-MA28 Numerical methods for partial differential Equations – Basic concepts for numeric partial differential equations are assumed.
Usability	In the Masters Course Computational Modeling and Simulation, the module is an optional module in the Track Computational Mathematics and in the Track Computational Modeling in Energy Economics, to be selected in accordance with Annex 2 to the Specific Examination Regulations. The module cannot be chosen in the Master's Course Computational Modeling and Simulation if this or a module with substantially the same content from a Course with which the entry conditions under § 3 of the Studienordnung have been met has already been completed. 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 non-public oral test performance as an individual test lasting 25 minutes. The language of the exam will be German or English, at the student's choice.
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.