Module name	**Advanced Topics in Finite Element Analysis**
Module number	CMS-TRK-AT
Senior Lecturer	Prof. Dr. Markus Kästner markus.kaestner@tu-dresden.de
Qualification objectives	Students have in-depth knowledge and skills in the numerical resolution of mechanical field problems, taking into account geometric and material non-linearities.
Contents	The module contains the basics of algebraisation and discretisation of initial limit value tasks, the Finite Elements Method (FEM) to approximate the resolution of mechanical field problems and the numerical properties of the process. The module continues to include FEM for dynamic and non-linear mechanical issues, as well as advanced aspects and applications such as modelling of discontinuities, adaptive discretisations and multi-scale modelling approaches.
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 linear agebra, numerics of differential equations and technical mechanics at bachelor's level is required.
Usability	The module is a mandatory module in track computational engineering in the Masters Course Computational Modeling and Simulation. In the Masters Course Computational Modeling and Simulation, the module is a compulsory voting module in Track Computational Life Science, 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 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.