Module name	**Computational laser systems**
Module number	CMS-TRK-CLS
Senior Lecturer	Prof. Dr. Jürgen Czarske juergen.czarske@tu-dresden.de
Qualification objectives	Students can use the knowledge of laser physics, systems theory, digital signal processing and Fourier optics to describe and design computational optical imaging systems.
Contents	The content of the module includes digital holography and image processing as well as biomedical laser systems and optogenetics, including but not limited to self-parametrisation of laser systems, optogenetics by stray tissue, neural networks for signal processing, adaptive optics and diffractive deep neural networks for optical computing at light speed.
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	Knowledge of physics at bachelor's level is required, as well as knowledge of systems theory and basics of optics and photonics at bachelor's level.
Usability	In the Computational Modeling and Simulation Masters Course, the module is a compulsory voting module in the Track Applied Artificial Intelligence, 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 30 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 winter semester.
Workload	The total workload is 150 hours.
Duration of the module	The module covers 1 semester.