Module Name	Computational Laser Systems
Module Number	EuI-ET-E-ComLS, EuI-IST-E-ComLS, EuI-MT-E-ComLS, EuI-NES-E-ComLS
Responsible Lecturer	Prof. Dr.-Ing. habil. Jürgen Czarske juergen.czarske@tu-dresden.de
Qualification Objectives	After completing the module, students are able to comprehensively describe and design complex, computer-based optical imaging methods. To this end, they apply the knowledge conveyed in the module, including laser physics, system theory, digital signal processing, and Fourier optics.
Contents	The module covers digital holography and image processing, as well as biomedical laser systems and optogenetics. This includes, among other topics, self-parameterizing laser systems for imaging and optogenetics through scattering tissue, neural networks for information processing and adaptive control of optical systems, and optical neural networks for image processing at the speed of light.
Teaching and Learning Forms	3 hours per week of lectures, 1 hour per week of exercises, and self-study. The language of instruction for lectures and exercises may be German or English and will be determined by the lecturer at the beginning of the semester and announced in the usual manner.
Prerequisites for Participation	In the diploma programs Electrical Engineering, Information Systems Engineering, and Mechatronics, knowledge of physics at advanced high school level and the competencies acquired in the module "Systems Theory" are required. In the Master's program Nanoelectronic Systems, knowledge of physics and systems theory at Bachelor's level is required.
Usability	The module is an elective module in the elective area "Competence Deepening" according to § 6 paragraph 3 SO and § 33 paragraph 4 PO of the main study program in the fields of Automation Technology and Robotics as well as Information Technology in the diploma program Electrical Engineering. Furthermore, it is an elective module in the elective area "Competence Deepening" according to § 6 paragraph 3 SO and § 33 paragraph 3 PO of the main study program in the field of Automation, Sensor Technology, and Robotics in the diploma program Information Systems Engineering. Additionally, it is an elective module in the elective area "Methods and Applications" according to § 6 paragraph 3 SO and § 33 paragraph 3 PO of the main study program in the diploma program Mechatronics. It is also an elective module according to § 6 paragraph 3 SO and § 33 paragraph 3 PO in the Master's program Nanoelectronic Systems. It creates the prerequisites for the modules that list this module in the field "Prerequisites for Participation."
Prerequisites for the Award of Credit Points	Credit points are awarded when the module examination is passed. The module examination consists of a non-public oral examination as an individual examination lasting 30 minutes.
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.