Only the german version of the module description as part of the study regulations is legally binding.

Module name	**Deep Learning for Vision - Foundations and Applications**
Module number	INF-25-Ma-FVC-DLVFA
Responsible lecturer	Prof. Dr. Martin Weigert martin.weigert@tu-dresden.de
Qualification objectives	Students are familiar with modern deep learning architectures for vision such as CNN and Vision Transformer and understand their methodological foundations, in particular folding, attention and the optimization of deep networks. They are familiar with scientific applications such as object recognition, segmentation and generative image modeling and are able to implement deep learning models, train and adapt pre-trained models to apply modern methods specifically to their own image processing problems.
contents	Contents of the module are basic concepts of deep learning for image data, including fundamental architectures such as CNN and Vision Transformer, basic problem classes such as segmentation, object recognition, image restoration and generative modeling, as well as training paradigms such as supervised and self-supervised learning. In addition, there are practical methods for training and evaluation, such as optimization procedures, regularization, data augmentation, transfer learning and evaluation metrics. Further contents are multimodal models, applications in various scientific disciplines and their practical implementation.
Forms of teaching and learning	The module includes lectures in the amount of 2 SWS, exercises in the amount of 2 SWS and self-study. The language of instruction of the lectures and exercises is English.
Prerequisites for participation	Basic knowledge of Linear Algebra, Analysis, Probability, Computer Programming, preferably Python and Machine Learning at Bachelor's level is required.
usability	The module is part of the diploma program Computer Science in the main course of study Compulsory elective module in the field of Visual Computing and Machine Learning, which is to be selected in accordance with Annex 2 to the Examination Regulations. In the Computer Science master's programme, the module is a compulsory elective module in the Open Track in the field of Visual Computing and Machine Learning as well as the supplement, which must be selected in accordance with Annex 2 to the examination regulations. The module can only be selected once in the Master's programme in Computer Science. The module cannot be chosen in the Master's program Computer Science if this or a substantially identical module has already been completed from a course with which the admission requirements according to § 3 of the study regulations have been met. The module creates the prerequisites for the modules that it designates under prerequisites for participation

Requirements for the award of credit points	Credits are earned when the module exam is passed. The module examination consists of a exam work of 90 minutes duration. The examination language is English.
Credits and grades	6 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 180 hours.
Duration of the module	The module consists of 1 semester.