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

Module name	**Linux Cluster in Theory and Practice**
Module number	INF-25-Ma-FTI-LCTP
Responsible lecturer	Dr. Robert Schöne robert.schoene@tu-dresden.de
Qualification objectives	Students are able to understand basics and concepts of Linux clusters including construction, administration, maintenance, and usage. You can analyze hardware and software architectures of clusters and evaluate their possible applications, as well as describe network and storage solutions for clusters. They understand batch systems and parallel programming in the High Performance Computing (HPC) environment and can apply this knowledge. You can evaluate and use monitoring and benchmarking methods for cluster performance assessment and optimization. They are able to apply the conveyed content in practical scenarios and develop solutions for typical challenges in cluster operation. They can classify typical topics from the field of high performance computing and are able to analyze the performance of Linux-based clusters.
contents	Contents of the module are the construction, administration, maintenance and use as well as the challenges and requirements of Linux clusters in theory and practice, the analysis and evaluation of the architecture and functioning of Linux clusters, the construction of cluster nodes and the use of network topologies and storage solutions. Further contents of the module are the basics of parallel programming, software delivery and management as well as monitoring and benchmarking methods, the optimization of the performance and efficiency of clusters and the sustainable design of their operation.
Forms of teaching and learning	The module includes lectures in the scope of 2 SWS, exercises in the scope of 2 SWS and self-study. The teaching language of the lectures and the exercises can be German or English and will be specified by the lecturer at the beginning of each semester and announced in the usual way.
Requirements for participation	In the graduate program Computer Science and in the bachelor program Computer Science, the competencies to be acquired in the modules INF-25-Ba-RA Computer Architecture and Hardware Laboratory as well as INF-25-Ba-BS Operating Systems are required. In the Master's program Computer Science, basic knowledge of the construction of computer systems as well as basic knowledge in the use of Linux and command lines at bachelor level is required. The following literature is suitable for preparation: John L. Hennessy, David A. Patterson (2011), Computer Architecture, Fifth Edition: A quantitative approach, https://dl.acm.org/doi/book/10.5555/1999263 Shotts, W.E. (2019). The Linux Command Line, 2nd Ed., No Starch Press, https://learning.oreilly.com/library/view/-/9781492071235/?ar

usability	The module is a compulsory elective module in the field of Computer Engineering and High Performance Computing in the diploma course Computer Science in the main course of study, which must be chosen in accordance with Annex 2 to the examination regulations. In the Bachelor's programme in Computer Science, the module is a compulsory elective module of specialisation, which must be chosen in accordance with the annex to the examination regulations. The module in the Master's program Computer Science is a compulsory elective module in the Open Track in the subject area Computer Engineering and High Performance Computing as well as the supplement, which is to be selected in accordance with Annex 2 to the examination regulations. The module can only be selected once in the Master's programme Computer Science. The module cannot be selected in the Master's program Computer Science if this or a substantially identical module from a degree program with which the admission requirements according to § 3 of the study regulations have been fulfilled, has already been completed. The module creates the prerequisites for the modules, which it names under prerequisites for participation.
Conditions for awarding credits	The credit points are earned when the module examination has been passed. The module examination consists of a non-public oral examination performance as an individual examination of 20 minutes duration. The language of the examination is German or English at the choice of the student.
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 summer semester.
workload	The total workload is 180 hours.
Duration of the module	The module consists of 1 semester.