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

Module name	**Virtualization Techniques**
Module number	INF-25-Ma-FTI- VirTe
Responsible lecturer	Prof. Dr. Josef Weidendorfer josef.weidendorfer@tu-dresden.de
Qualification goals	Students are able to classify and evaluate different virtual machine implementations, both in terms of the concepts used and the products currently in use. They can analyze their usefulness in various scenarios and understand technical design compromises, implementation challenges, and typical solutions for optimal performance and usability.
Contents	The module covers the description and classification of various commonly used virtual machines, their advantages and disadvantages, and areas of application. It also includes concepts and techniques frequently used in implementation to enable their use with acceptable performance. The focus is particularly on process-level and system-level VMs, as well as high-level language VMs. Further topics include techniques such as ISA virtualization, from interpretation to binary-level translation, and the functionality of modern hardware that allows for improved system virtualization.
Teaching and learning methods	The module comprises lectures totaling 3 semester hours per week (SWS), tutorials totaling 1 SWS, and self-study. The language of instruction for both lectures and tutorials is English.
Requirements for participation	The Diploma program in Computer Science requires the competencies acquired in the modules INF-25-Ba-RA Computer Architecture and Hardware Lab, INF-25-Ba-BS Operating Systems, INF-25-Ba-RN Computer Networks, and INF-25-Ma-FSP-CB Compiler Construction. The Master's program in Computer Science requires knowledge of computer system architecture, a fundamental understanding of operating systems and compiler construction, and programming skills in C/C++ at the Bachelor's level. The following literature is suitable for preparation: 1. Virtual Machines, Versatile Platforms for Systems and Processes, James E. Smith, Ravi Nair. Elsevier/Morgan Kaufmann, 2005. 2. Hardware and Software Support for Virtualization, Edouard Bugnion , Jason Nieh , Dan Tsafrir . Synthesis Lectures on Comp.Arch , M&C, 2017.

Applicability	In the Diploma program in Computer Science, this module is an elective module in the field of Computer Engineering and High Performance Computing, to be selected according to Appendix 2 of the examination regulations. In the Master's program in Computer Science, this module is an elective module in the Open Track within the field of Computer Engineering and High Performance Computing, as well as in the supplementary module, to be selected according to Appendix 2 of the examination regulations. This module can only be selected once in the Master's program in Computer Science. This module cannot be selected in the Master's program in Computer Science if this module, or a substantially equivalent module from a degree program that fulfills the admission requirements according to § 3 of the study regulations , has already been completed. This module fulfills the prerequisites for the modules listed under "Prerequisites for Participation."
Requirements for earning credit points	Credit points are awarded upon successful completion of the module examination. The module examination consists of a 90-minute written exam. The examination language is English.
Credit points and grades	Six credit points can be earned through this module. The module grade corresponds to the grade for the examination.
Frequency of the module	The module is offered every summer semester.
Workload	The total workload is 180 hours.
Module duration	The module lasts one semester.