

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

Module name	Highly Parallel Programming of GPUs
Module number	INF-25-Ma-FTI-HPGPU
Responsible lecturer	Prof. Dr. Wolfgang Nagel wolfgang.nagel@tu-dresden.de
Qualification objectives	Students are able to analyze and evaluate manycore architectures using the example of graphics processing units (GPUs). They are able to develop and optimize algorithms for these architectures .
Content	The module covers highly parallel algorithms for manycore architectures with a focus on modern graphics cards, which are used both in the consumer sector and in high-performance computing . Further content includes programming models and programming techniques for massively parallel environments and various GPU APIs for parallelization, computer graphics and deep learning and working with remote GPU instances.
Teaching and learning methods	The module comprises lectures of 2 SWS, exercises of 1 SWS, practicals of 1 SWS and self-study . The language of instruction for the lectures, exercises and practicals may be German or English and will be specified by the lecturer at the beginning of each semester and announced in the usual manner.
Prerequisites for participation	In the Diploma degree course in Computer Science, the Bachelor's degree course in Computer Science and the Bachelor's degree course in Applied Computer Science, the skills to be acquired in the module INF-25-Ba-RA Computer Architecture and Hardware Laboratory are a prerequisite. In the Master's degree program in Computer Science, knowledge of the design of computer systems at Bachelor's level and programming skills in C/C++ are required. The following literature is suitable for preparation ur: Computer architecture: a quantitative approach, J. L. Hennessy, D. A. Patterson, Elsevier, 2011. Chapter 4, Programming: principles and practice using C++, Bjarne Stroustrup. Addison-Wesley, 2014.
Applicability	The module is a compulsory elective module in the subject area Computer Engineering and High Performance Computing in the Diploma degree program in Computer Science in the main course of study, which must be selected in accordance with Annex 2 to the examination regulations. In the Bachelor's degree program in Informatics, the module is a compulsory elective module in the subject area of specialization, which must be selected in accordance with the appendix to the examination regulations. In the Bachelor's degree course in Applied Computer Science, the module is a compulsory elective module in the specialization in Media Informatics and in the specialization in Medical Informatics, which must be selected in accordance with the annex to the examination regulations. In the Master's degree program in Computer Science, the module is a

	compulsory elective module in the open track in the subject area of Computer Engineering and High Performance Computing 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 degree program in Computer Science. The module cannot be chosen in the Master's degree program in Computer Science if this module or a module with essentially the same content from a degree program in which the admission requirements according to § 3 of the study regulations have been fulfilled, has already been completed. The module fulfills the prerequisites for the modules listed under prerequisites for participation.
Requirements for earning credit points	The credit points are earned if the module examination is passed. The module examination consists of a written examination lasting 90 minutes. A bonus achievement for the written examination is a programming of 8 hours. The examination language may be German or English and will be specified by the lecturer at the beginning of each semester and announced in the usual manner.
Credit points and grades	6 credit points can be earned through the module. The module grade corresponds to the grade of the examination.
Module frequency	The module is offered every winter semester.
Workload	The total workload is 180 hours.
Module duration	The module comprises one semester.