

Module Name	Deep Neural Network Hardware
Module Number	Eul-IST-E-DNNH, Eul-NES-E-DNNH
Responsible Lecturer	Prof. Dr.-Ing. habil. Christian Georg Mayr christian.mayr@tu-dresden.de
Qualification Objectives	After completing the module, students will have knowledge of the essential design decisions for Deep Neural Network (DNN) accelerators. They will be able to select or design an accelerator for a given application. Students will know and understand the necessary steps for executing DNNs on hardware accelerators as well as common optimization methods for DNN accelerators.
Contents	The module covers the design of hardware accelerators for artificial neural networks – Deep Neural Networks (DNN) – from architectures to arithmetic building blocks. Furthermore, topics of hardware/software co-design for DNN accelerators and the necessary steps for executing DNNs on hardware accelerators are addressed. Finally, current optimization methods and novel approaches for DNN accelerators are introduced.
Teaching and Learning Forms	2 hours per week of lectures, 2 hours per week of exercises, and self-study. The language of instruction for lectures and exercises is English.
Prerequisites for Participation	In the Master's program Nanoelectronic Systems, basic knowledge of Deep Neural Networks and digital circuits at the Bachelor's level is required. In the diploma program Information Systems Engineering, the competencies to be acquired in the module "Advanced Analog and Digital Circuit Design" are required.
Usability	The module is an elective module according to § 6 paragraph 2 of the study regulations and § 33 paragraph 3 of the examination regulations for the specialization Nanoelectronics in the Master's program Nanoelectronic Systems. Furthermore, it is an elective module in the elective area "Competence Deepening" according to § 6 paragraph 3 of the study regulations and § 33 paragraph 3 of the examination regulations of the main study program in the field of Microelectronics, Electronic Circuits, and Systems in the diploma program Information Systems Engineering. The module creates the prerequisites for the modules that list it under "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 written exam lasting 90 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 summer semester.
Workload	The total workload is 150 hours.
Duration of the Module	The module lasts one semester.