

Module Name	Neuromorphic VLSI Systems
Module Number	Eul-ET-E-NVLSI, Eul-NES-E-NVLSI, Eul-IST-E-NVLSI
Responsible Lecturer	Prof. Dr.-Ing. habil. Christian Georg Mayr christian.mayr@tu-dresden.de
Qualification Objectives	After completing the module, students are familiar with the field of neural networks, from neurobiological foundations to application circuits. They are capable of using industrial design tools such as Cadence DF2 or Spectre, designing CMOS circuits, dimensioning them, verifying performance parameters through simulation, and creating corresponding circuit layouts.
Contents	The module covers: - Design methods for integrated analog CMOS circuits and their circuit dimensioning - Neuromorphic VLSI systems and their neurobiological foundations, common abstraction models, and applications in research and technology, such as brain-machine interfaces and signal processing - Fundamentals, concepts, and methods for the creation and analysis of analog and neuromorphic CMOS circuits using the design software Cadence DF2
Teaching and Learning Forms	4 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, knowledge in the fields of circuit design and systems theory at the Bachelor's level is required. In the diploma programs Electrical Engineering and Information Systems Engineering, the competencies to be acquired in the modules Basics of Electrical Engineering, Circuit Design, and Systems Theory are required.
Usability	The module is an elective module according to § 6 Paragraph 2 SO and § 33 Paragraph 3 PO of 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 SO and § 33 Paragraph 4 PO of the main study program in the specialization Information Technology in the diploma program Electrical Engineering. Additionally, it is an elective module in the elective area "Competence Deepening" according to § 6 Paragraph 3 SO and § 33 Paragraph 3 PO of the main study program in the field of Microelectronics, Electronic Circuits, and Systems in the diploma program Information Systems Engineering. It creates the prerequisites for the modules that list this module in the field "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 portfolio with a workload of 30 hours and a non-public oral examination as an individual examination lasting 20 minutes.
Credit Points and Grades	7 credit points can be earned through the module. The module grade is determined by the weighted average of the grades of the examination components. The portfolio is weighted twice, and the oral examination is weighted once.
Frequency of the Module	The module is offered every winter semester.
Workload	The total workload is 210 hours.
Duration of the Module	The module lasts one semester.