Module Name	Circuit and System Design
Module Number	EuI-ET-C-SSE, EuI-IST-C-SSE
Responsible Lecturer	Prof. Dr.-Ing. habil. Christian Georg Mayr christian.mayr@tu-dresden.de
Qualification Objectives	After completing the module, students are able to systematically develop the datapath – register-transfer description – and the control unit – FSM – of a self-selected numerical algorithm using a data dependency graph. They are familiar with the implementation flow, which includes both the automated synthesis of complex blocks based on a hardware description language, such as Verilog, and manually optimized digital datapath elements.
Contents	The module covers the fundamentals and methods for the development of application-specific digital integrated circuits (ASICs). This includes transforming a numerical algorithm into a data dependency graph, applying scheduling and allocation methods, optimizing resource consumption in terms of area and runtime, as well as implementing and functionally verifying (simulation) the ASIC.
Teaching and Learning Forms	2 hours per week of lectures, 1 hour per week of exercises, 1 hour per week of projects, and self-study.
Prerequisites for Participation	The competencies to be acquired in the modules Introduction to Analysis and Algebra, Multidimensional Differential and Integral Calculus, Function Theory, Partial Differential Equations and Probability Theory, Microelectronic Technologies and Components, Circuit Design, and Systems Theory are required.
Usability	The module is a compulsory module of the main study program in the field of Information Technology in the diploma program Electrical Engineering. Furthermore, it is a compulsory module of the main study program 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 complex assignment with a workload of 40 hours.
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.