

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

Module name	Automata and computability theory
Module number	INF-25-Ba-AuB
Responsible lecturer	Prof. Dr. Markus Krötzsch markus.kroetzsch@tu-dresden.de
Qualification objectives	Students master the basics of representing, analyzing and processing formal languages. They are familiar with different approaches to the specification of syntax and can analyze and compare these approaches with regard to various structural properties. They know the relationship between formal languages and important formal models of computation and understand the possibilities and limitations of these models.
Content	The module covers topics in the areas of formal languages, automata theory and computability, such as the Chomsky hierarchy with the classes of regular, context-free and context-sensitive languages as well as type 0 languages, forms of representation of formal languages such as grammars, automata models and regular expressions, Methods for analyzing the properties of formal languages, word problems and other computational problems and methods for solving them, finite automata, basement automata and Turing machines, determinism and non-determinism in automata models, other computational models such as WHILE and LOOP programs or recursive functions; Computability theory, including relevant basic concepts, typical undecidable problems and uncomputable functions.
Teaching and learning methods	The module comprises lectures of 4 SWS, exercises of 2 SWS and the self bststudium. The language of instruction for the lectures and exercises is German.
Prerequisites for participation	The competences to be acquired in the modules INF-25-Ba-Ma1 Linear Algebra and Analysis, INF-25-Ba-Ma2 Discrete Structures and INF-25-Ba-AuD Algorithms and Data Structures are assumed.
Applicability	The module is a compulsory module in the undergraduate degree program in Computer Science. The module is a compulsory module in the Bachelor's degree course in Computer Science. The module creates 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. The examination language is German.
Credit points and grades	9 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 270 hours.

Module duration	The module comprises one semester.
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