

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

Module name	Advanced Theoretical Computer Science and Symbolic Artificial Intelligence
Module number	INF-25-Ma-FTK-TI
Responsible lecturer	Prof. Dr. Christel Baier christel.baier@tu-dresden.de
Qualification objectives	Students have in-depth knowledge of the scientific methods of the subfield of theoretical computer science. They have internalized the central concepts of the respective subfield, can reproduce its core statements mathematically correctly, formally justify and apply them, and have the ability to independently derive and prove statements based on them regarding the algorithmic, semantic or logical foundations of the subfield.
Content	Contents of the module are algorithm and complexity theory, formal languages and automata theory, semantics of programming languages, theoretical foundations of program analysis, theory and verification of parallel systems as well as logical foundations of the topics mentioned areas.
Teaching and learning methods	The module comprises lectures of 4 SWS and exercises of 2 SWS as well as self-study. The teaching language of the lectures and exercises 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 program in Computer Science, the courses offered in the modules INF-25-Ba-AuD Algorithms and Data Structures, INF-25-Ba-AuB Automata and Computability Theory, INF-25-Ba-LuK Logic and Complexity, INF-25-Ba-Ma1 Linear Algebra and Analysis, INF-25-Ba-Ma2 Discrete Structures, INF-25-Ba-Ma3 Algebra, INF-25-Ba-Ma4 Probability Theory and Statistics, INF-25-Ba-DMF Data Management Foundations, INF-25-Ba-SWT Software Technology and INF-25-Ba-KI Artificial Intelligence. The Master's degree course in Computer Science requires knowledge of the fundamentals of algorithm design, formal languages, theoretical computer science and propositional and predicate logic as well as knowledge of mathematics at Bachelor's level,
Applicability	The module is a compulsory elective module in the Diploma degree course in Computer Science in the main study dium in the subject area of Theoretical Computer Science and Symbolic Artificial Intelligence, which must be selected in accordance with Annex age 2 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 Theoretical Computer Science and Symbolic Artificial Intelligence as well as the supplement, which must be selected in accordance with Annex 2 to the examination regulations. The module can only be chosen once in the Master's degree program in Computer Science. The module cannot n be selected 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 Section 3 of the study regulations have already been met has already been completed. 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 non-public oral examination as an individual examination lasting 30 minutes. 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	The module can be used to acquire 9 credit points . The module grade corresponds to the grade of the examination.
Module frequency	The module is offered every summer semester .
Workload	The total workload is 270 hours.
Module duration	The module comprises one S emester.