

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

Module name	Randomized algorithms
Module number	INF-25-Ma-FTK-RA
Responsible lecturer	Prof. Dr. László Kozma laszlo.kozma@tu-dresden.de
Qualification objectives	Students have in-depth knowledge of scientific methods in the development and analysis of algorithms using chance. They understand the properties of specific input and output models as well as their impact on the analysis of algorithms. They know a wide repertoire of advanced techniques and can use them for the formal presentation of algorithmic problems as well as the development of algorithms. They are able to formally analyze the correctness and efficiency of randomized algorithms and have solid knowledge of a variety of mathematical methods for this purpose.
contents	Contents of the module are algorithm and complexity theory as well as specific topics of randomized algorithms, such as sampling methods, random paths, derandomization, stochastic input models and related mathematical fields such as the theory of random graphs and the probabilistic method. Other contents of the module are algorithms for problems related to graphs, geometric objects or formal languages.
Forms of teaching and learning	The module includes lectures in the scope of 4 SWS and exercises in the scope of 2 SWS as well as self-study. The teaching language of the lectures and the exercises can be German or English and will be specified by the lecturer at the beginning of each semester and announced in the usual way.
Requirements for participation	In the Computer Science degree program, the competencies to be acquired in the modules INF-25-Ba-AuD Algorithms and Data Structures, INF-25-Ba-AuB Automata and Predictability Theory, INF-25-Ba-LuK Logic and Complexity, INF-25-Ba-Ma1 Linear Algebra and Analysis, INF-25-Ba-Ma2 Discrete Structures and INF-25-Ba-Ma3 Algebra are required. The Master's programme in Computer Science requires knowledge of the basics of algorithm design, formal languages, theoretical computer science and mathematics at Bachelor's level.

usability	The module is a compulsory elective module in the field of Theoretical Computer Science and Symbolic Artificial Intelligence in the master's degree programme Computer Science, which must be chosen in accordance with Annex 2 to the Examination Regulations. The module in the Master's programme Computer Science is a compulsory elective module in the Open Track in the subject area Theoretical Computer Science and Symbolic Artificial Intelligence as well as the supplement, which is to be selected in accordance with Annex 2 to the examination regulations. The module can only be selected once in the Master's programme Computer Science. The module cannot be selected in the Master's program Computer Science if this or a substantially identical module from a degree program with which the admission requirements according to § 3 of the study regulations have been fulfilled, has already been completed. The module creates the prerequisites for the modules, which it names under prerequisites for participation.
Conditions for awarding credits	The credit points are earned when the module examination has been passed. The module examination consists of a non-public oral examination performance as an individual examination of 30 minutes duration. The language of the examination can be German or English and will be specified by the lecturer at the beginning of each semester and announced in the usual manner.
Credits and grades	9 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 270 hours.
Duration of the module	The module consists of 1 semester.