

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

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| Module name                     | <b>Advanced Symbolic Artificial Intelligence</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Module number                   | INF-25-Ma-FTK-ASAI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Responsible lecturer            | Prof. Dr. Sebastian Rudolph<br>sebastian.rudolph@tu-dresden.de                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Qualification objectives        | Students are familiar with scientific methods of symbolic artificial intelligence that are relevant for applications in computer science. They understand their formal modeling, know the important problems and procedures and can solve them. They are able to formally investigate the expressiveness and computational properties of these problems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Content                         | Contents of the module are logical foundations of artificial intelligence, knowledge representation and automatic reasoning, information systems and deductive databases, knowledge graphs, ontologies, semantic technologies, description of processes, planning problems, natural language processing and symbolic learning methods.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Teaching and learning methods   | The module comprises lectures of 4 SWS, exercises of 2 SWS and the selfbststudium. The language of instruction for the lectures and exercises is English.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Prerequisites for participation | In the Diploma program in Computer Science, 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 program in Computer Science in the main course in the subject area Theoretical Computer Science and Symbolic Artificial Intelligence, which must be selected in accordance with Annex 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 course in Computer Science. The module cannot be selected in the Master's degree program in Computer Science if the student has already completed a module with essentially the same content from a degree program with which the admission requirements according to § 3 of the study regulations were fulfilled. The module creates the prerequisites for the modules listed under prerequisites for |

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|                                        | participation nnen.                                                                                                                                                                                                      |
| 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 is English. |
| 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.                                                                                                                                                                                       |