

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

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| Module name                     | <b>Self-Adaptive Software and Cobotics</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Module number                   | INF-25-Ma-FSP-SESAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Responsible lecturer            | Prof. Dr. Uwe Aßmann<br>uwe.assmann@tu-dresden.de                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Qualification objectives        | Students know advanced principles of software modeling for self-adaptive and cobotic systems, especially for collaborative robotics. They are familiar with the concepts of autonomous control, which is described by the MAPE-K loop, action grammar, which is referred to as motion grammar, hybrid Petri nets and context-oriented modeling. They can apply these formal concepts to software for collaborative robotics, are familiar with platform concepts such as the Robot Operating System (ROS) and can use software techniques for the construction of cobotic industrial cells.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Content                         | The module covers the software development of self-adaptive and cobotic systems, context modelling, sensory and hybrid modelling, multi-objective optimization as well as software techniques for industrial cobotics, swarm and telorobotics at the application ndungsebene.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Teaching and learning methods   | The module comprises lectures of 2 SWS, exercises of 2 SWS and the self bststudium. The language of instruction for the lectures and exercises is English.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Prerequisites for participation | In the Diploma degree program in Computer Science, the competences to be acquired in the modules INF-25-Ba-SWT Software Technology, INF-25-Ba-DMF Data Management Foundations and INF-25-Ba-KI Artificial Intelligence are set in advance .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Applicability                   | The module is a compulsory elective module in the Diplom degree course in Computer Science in the main course in the subject area Software Technology and Program ming Languages, which must be selected in accordance with Annex 2 to the examination regulations. In the Master's degree program in Computer Scienc e, the module is a compulsory elective module in the Open Track in the subject area Software Technology and Programming Languages and the supplement, which must be selected in accordance with Annex 2 to the Examination Regulations, and in the Distributed Systems Engineering Track, which must be selected in accordance with Annex age 3 to the Examination Regulations. The module can only be chosen once in the Master's degree program in Computer Science. The module cannot be chosen in the Master's degree program in Computer Science if this module or a module with essentially the same content from a degree program with which the admission requirements according to § 3 of the study regulations have already been fulfilled has already been completed. The module creates the prerequisites for the modules listed under prerequisites for participation. |

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| 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 15 minutes. Bonus achievement for r oral examination is the solving of computer-based exercises of 15 hours and hours. The examination language is English. |
| Credit points and grades               | 6 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 180 hours.                                                                                                                                                                                                                                                                                                    |
| Module duration                        | The module comprises one semester.                                                                                                                                                                                                                                                                                                  |