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| Module name | **Advanced Problem Solving and Search** |
| Module number | CMS-TRK-APSS |
| Senior Lecturer | Dr Sarah Alice Gaggl<br>sarah.gaggl@tu-dresden.de |
| Qualification objectives | Students are familiar with scientific methods of dealing with serious combinatorial and search problems relevant to IT applications. They understand their formal modelling and know how to solve them. They are able to formally investigate calculation properties of these problems and associated algorithms. |
| Contents | The content of the module includes uninformed and informed search, local search, stochastic Hill Climbing, simulated Annealing, taboo search, constraint satisfaction problems, evolutionary and genetic algorithms, response quantity programming, and structural decomposition techniques such as tree and hypertree decomposition. |
| Forms of teaching and learning | The module includes lectures of 2 SWS, exercises of 2 SWS and self-study. The language of the lectures and exercises will be English. |
| Eligibility for participation | Knowledge of the basics of algorithm design, formal languages, theoretical informatics and the logic of statements and predictions, as well as mathematics at bachelor's level are required. |
| Usability | In the Computational Modeling and Simulation Masters Course, the module is an optional module in Track Computational Modeling in Energy Economics, Track Applied Artificial Intelligence, Track Computational Engineering and Track Computational Life Science, to be selected in accordance with Annex 2 to the Specific Test Rules. The module cannot be chosen in the Master's Course Computational Modeling and Simulation if this or a module with substantially the same content from a Course with which the entry conditions under § 3 of the Studienordnung have been met has already been completed. The module provides the pre-requisites for the modules it designates under the pre-requisites for participation. |
| Conditions for the award of credits | Credits are awarded when the module test is passed. The module test consists of a 90-minute away day. The language of the test will be English. |
| Credits and marks | The module allows 5 credit points to be obtained. The module score corresponds to the test performance score. |
| Frequency of the module | The module is offered every winter semester. |
| Workload | The total workload is 150 hours. |
| Duration of the module | The module covers 1 semester. |