| Module number | Module name | Module coordinator |
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| BIW-MA-AC-O-04 | Numerical Methods | Prof. Dr. Uwe Reuter<br>uwe.reuter@tu-dresden.de |
| **Learning goals** | Students are able to apply basic and advanced numerical methods to solve engineering and scientific issues of civil engineering. Students will have the necessary programming knowledge to implement the numerical methods. They are able to apply their knowledge to questions in their field and critically evaluate the results. | |
| **Content** | Contents of the module are design and analysis of algorithms for the numerical solution of continuous mathematical problems, direct methods that give the exact solution to a problem in a finite number of steps and for an infinite computer accuracy, iterative methods to compute approximations that converge to the exact solution of a problem, linear algebra and analytical geometry, solutions for linear and nonlinear equations, systems of equations, extremum and eigenvalue problems, numerical integration, interpolation, regression and implementation of the algorithms in software solutions. | |
| **Teaching and learning methods** | 2 SWS lecture, 2 SWS tutorial, self-study. | |
| **Prerequisites** | Knowledge of differential and integral calculus and linear algebra at Bachelor level are assumed. | |
| **Applicability** | The module is a required module in the Master's program Advanced Computational and Civil Engineering Structural Studies – ACCESS. It is a prerequisite for the module Safety Concepts and the module Building Information Modeling: Methods and Concepts. | |
| **Requirements for earning credit points** | The credit points are acquired when the module examination is passed The module examination comprises a 90-minute written test. Prerequisite is an assignment about 40 hours. The examination language is English. | |
| **Credit points and grades** | Five credit points can be acquired through the module. The module grade is equivalent to the examination grade. | |
| **Module frequency** | The module is offered in each winter semester. | |
| **Workload** | The total workload is 150 hours. | |
| **Module duration** | The duration of the module is one semester. | |