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|---|--------------------------|---|
| <b>Module title</b>   |                          | <b>Abbreviation</b>                         |
| Ordinary Differential Equations   |                          | 10-M-DGL-222-m01                            |
| <b>Module coordinator</b>   |                          | <b>Module offered by</b>                    |
| Dean of Studies Mathematik (Mathematics)  |                          | Institute of Mathematics                    |
| <b>ECTS</b>   | <b>Method of grading</b> | <b>Only after succ. compl. of module(s)</b> |
| 10  | numerical grade          | --  |
| <b>Duration</b>   | <b>Module level</b>      | <b>Other prerequisites</b>                  |
| 1 semester  | undergraduate            | --  |
| <b>Contents</b>   |                          |   |
| <p>Notion of a solution, simple solution methods for scalar differential equations (separation of variables, variation of constants, exact equations) and particular examples like Bernoulli, Riccati; initial value problem; existence and uniqueness of solutions; Gronwall lemma; extendability of solutions, maximal solution; continuous dependence of solutions on initial values, linear differential equations, algebraic structure of solution spaces, solution methods, matrix exponential function; autonomous systems; notion of stability; stability of linear systems; linearised asymptotic stability; Lypunov methods, first integrals.</p> |                          |   |
| <b>Intended learning outcomes</b>   |                          |   |
| <p>The student is acquainted with the fundamental concepts and methods of the theory of ordinary differential equations. He/she is able to apply these methods to practical problems.</p>   |                          |   |
| <b>Courses</b> (type, number of weekly contact hours, language – if other than German)  |                          |   |
| V (4) + Ü (2)   |                          |   |
| <b>Method of assessment</b> (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus)  |                          |   |
| <p>a) written examination (approx. 90 to 180 minutes, usually chosen) or<br/> b) oral examination of one candidate each (15 to 30 minutes) or<br/> c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate)<br/> creditable for bonus<br/> Language of assessment: German and/or English</p>   |                          |   |
| <b>Allocation of places</b>   |                          |   |
| --  |                          |   |
| <b>Additional information</b>   |                          |   |
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| <b>Workload</b>   |                          |   |
| 300 h   |                          |   |
| <b>Teaching cycle</b>   |                          |   |
| --  |                          |   |
| <b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)  |                          |   |
| --  |                          |   |
| <b>Module appears in</b>  |                          |   |
| <p>Bachelor' degree (1 major) Mathematical Data Science (2022)<br/> exchange program Mathematics (2023)</p>   |                          |   |