<table>
<thead>
<tr>
<th>Module level</th>
<th>Creditpoints</th>
<th>Language</th>
<th>Return annual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master</td>
<td>6</td>
<td>English</td>
<td>annual</td>
</tr>
</tbody>
</table>

**Module designation**

**Mathematics**

**Course(s)**

**Analytic and Numerical Solution of Ordinary and Partial Differential Equations**

<table>
<thead>
<tr>
<th>Code</th>
<th>Subtitle</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Person responsible for the module**

Prof. Dr. rer. nat. habil. Andreas Meister

**Lecturer**

Prof. Dr. rer. nat. habil. Andreas Meister

**Workload**

180 h (30h contact study, 60hexercises, 90hprivate study)

**Relation to curriculum**

Basic studies, compulsory optional subject

**Type of teaching, contact hours**

Virtual classrooms

**Requirements according to examination regulations**

None

**Recommended prerequisites**

None

**Module objective / intended learning outcomes**

This course provides an introduction to both ordinary and partial differential equations as well as fundamental numerical methods. These ingredients represent basic knowledge for each subsequent course in the field of fluid mechanics and mechanics of materials.

At the end of the course, the students should:

- Understand the basic theory for the solution of ordinary differential equations.
- Have experience in solving ordinary differential equations analytically.
- Have knowledge with respect to partial differential equations as well as the behaviour of their solution in the context of standard elliptic, parabolic and hyperbolic problems.
- Be able to choose and apply adequate numerical methods for different scientific tasks like interpolation, numerical integration, linear and nonlinear systems of equations and systems of ordinary differential equations.

**Content**

- Ordinary and partial differential equations
  - Analytic solution of ordinary differential equations
  - Classification of partial differential equations
  - Analytic solution of the wave and heat equation
- Numerical Mathematics
  - Interpolation
  - Numerical integration
  - Methods for linear systems of equations
  - Methods for nonlinear systems of equations
  - Methods for systems of ordinary differential equations

**Study and examination requirements and forms of examination**

Written exam (90 – 120 min) or oral online-exam (20–30min)

**Media employed**

Online script

**Reading list**

Reading list will be provided by lecturer via Moodle online platform.