Module level Master	Creditpoints 6	Language English	Return annual
Module designation Mathematics			
Course(s) Analytic and Numerical Solution of Ordinary and Partial Differential Equations			
Code	**Subtitle**		
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 system of equations and systems of ordinary differential equations.

Content

- Ordinary and partial differential equations
  - Introduction to fundamental topics from vector analysis
  - 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

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.