**Module Name:** Numerical Analysis of Differential Equations  

**Responsible:** Eiermann, Michael / Prof. Dr.  
**Lecturer(s):** Eiermann, Michael / Prof. Dr.  
Rheinbach, Oliver / Prof. Dr.  
Helm, Mario / Dr.  

**Institute(s):** Institute of Numerical Mathematics and Optimization  

**Duration:** 1 Semester(s)  

**Competencies:** Students shall have an understanding to fundamental techniques for the numerical solution of ordinary and partial differential equations. The students know relevant terms in English.  

**Contents:** ODEs: Euler methods, Runge Rutta Methods, Linear Multistep Methods, Stability, Stiffness;  
PDEs: Finite Difference techniques, time stepping, von Neumann stability analysis. International literature and relevant terms in English are explained.  

**Literature:** Finite Difference Methods for Ordinary and Partial Differential Equations von Randy Leveque, University of Washington  

**Types of Teaching:** S1 (SS): Lectures (2 SWS)  
S1 (SS): Exercises (1 SWS)  

**Pre-requisites:** Misc: Advanced mathematics course for scientists and engineers. Some familiarity with the theory or applications of differential equations is helpful  

**Used in:** Verfahrenstechnik, DIPL (WP)  
Computational Science and Engineering, MA (WP)  

**Frequency:** yearly in the summer semester  

**Requirements for Credit Points:** For the award of credit points it is necessary to pass the module exam. The module exam contains:  
KA [120 min]  

**Credit Points:** 3  

**Grade:** The Grade is generated from the examination result(s) with the following weights (w):  
KA [w: 1]  

**Workload:** The workload is 90h. It is the result of 45h attendance and 45h self-studies.