Module Title	Module Code
Numerical Methods for Partial Differential Equations	mathNumPDE-01a

Module Coordinator
Prof. Dr. Steffen Börm
Organizer
Department of Mathematics
Faculty
Faculty of Mathematics and Natural Sciences
Examination Office
Examination office at the Department of Mathematics
English Module Title
Numerical Methods for Partial Differential Equations

ECTS Credits	9
Evaluation	graded
Examination Number(s)	44010
Duration	one semester
Frequency	irregular
Workload per ECTS Credit	30 hours
Total Workload	270 hours
Contact Time	84 hours
Independent Study	186 hours
Teaching Language	Deutsch / Englisch (bei Bedarf)

Recommended Requirements
Knowledge of the contents of *Einführung in die numerische Mathematik* or a similar introduction to numerical methods
Module Courses
• Lecture (compulsory, 4 weekly contact hours) • Tutorial (compulsory, 2 weekly contact hours)
Prerequisits for Admission to the Examination(s)
Prerequisits may be appointed as per §4a Fachprüfungsordnung Mathematik (examination regulations) of 2017. Details will be announced at the start of the courses. It is strongly recommended to attend the lectures and tutorials.
Examination(s)
Written exam (max. 180 minutes) or oral exam (max. 30 minutes), graded, weight 100%

Summary

We consider fundamental techniques for treating partial differential equations, particularly those that appear in the context of numerical simulations.

Course Content

The lecture deals with the following topics:
- Finite difference methods for elliptic PDEs
- Analysis of the discretization error (consistency, stability, convergence)
- Finite difference methods for parabolic equations
- Simple finite element methods

Learning Outcome

Students are familiar with the most important techniques for discretizing and solving partial differential equations. They are able to choose an appropriate algorithm for a given application, and they are familiar with methods required for the mathematical analysis of these algorithms.

Reading List

Will be announced at the start of the courses.

Additional Information

Bei der Berechnung der Präsenzzeit wurde ein Semester mit 14 Wochen zugrundegelegt.

Use

Master, 1-Fach, Mathematik (Version 2007/17)
- Wahlbereich Angewandte Mathematik (Numerik)
- Wahlbereich Vorlesung mit Übungen nach Wahl

Master, 2-Fächer, Mathematik (Version 2007)
- Wahlbereich Vorlesungen zur Mathematik
- Wahlbereich Vertiefende Vorlesungen zur Mathematik

Master, 2-Fächer, Mathematik (Version 2017)
- Wahlbereich Vorlesungen zur Mathematik

Export
- Master, 1-Fach, Informatik

Master, 1-Fach, Finanzmathematik (Version 2007/17)
- Wahlbereich Vertiefung Mathematik (angewandt)