EBERHARD KARLS
UNIVERSITÄT
TÜBINGEN

Mathematisch-Naturwissenschaftliche Fakultät

Fachbereich Mathematik

AB Geometrische Analysis, Differentialgeometrie und Relativitätstheorie

Wintersemester 2023/24

Vorlesung

Introduction to Partial Differential Equations/ Einführung in Partielle Differentialgleichung

Lecturer: Prof. Dr. Gerhard Huisken

Start: Wednesday, 18th October 2023

Time: Wednesdays, 16:00-18:00 and Fridays, 10:00-12:00

Place: Hörsaal N16 / M3 (C-Building Mathematik/Physik)

Tutorial: 2 hours/week **Tutor:** Andoni Royo Abrego **Start:** Thursday, 19th October 2023
Time: Thursdays, 10:00-12:00 **Place:**C5H41 / S08(C-Building Mathematik/Physik)

Study programs: Master in Mathematics and in Mathematical Physics

Modul number: MAT- 55-21; 9 ECTS points
Study areas: Analysis und Differentialgeometrie, Mathematische Physik

Language: English

Description:
The course will give an introduction to linear partial differential equations of second order, with a focus on elliptic and parabolic equations. Specific topics include:

- Examples of important linear PDEs and their motivation (Laplace and Poisson equation, heat equation, wave equation)
- Harmonic functions, Greens function
- Maximum principles
- Sobolev spaces and L^2-theory of weak solutions to elliptic equations
- Euler-Lagrange equations
- Eigenvalue problems
- Heat kernel and basic properties of the heat equation

Prerequisites:
Bachelor degree or equivalent

Literature:
David Gilbarg and Neil S. Trudinger, Elliptic partial differential equations of second order, Springer Grundlehren, (2001).

Lawrence C. Evans, Partial Differential Equations, American Mathematical Society (1998).

Michael E.Taylor, Partial Differential Equations I, Appl. Math. Sciences 115, Springer 1996.

Exam: Participation in tutorials; written or oral exam depending on course size.