

Department: Mathematics and Computer Sciences
Division: Applied Mathematics
Level and Major: Graduate

Course Title: Numerical Methods in Financial Mathematics

Number of Credits: 3

Prerequisite:

Lecturer:

Course Description: The lecture gives an introduction to some of the most important numerical methods in financial mathematics. A central topic of this lecture is the finite difference methods and its applications to stochastic differential equations,

Course Goals and Objectives:

Course Topics:

- Basic concepts of numerical analysis
- Numerical methods for solving linear and one-linear system of equations, Numerical integration and Numerical methods for solving ODEs
- Converting the Black-Scholes equation to the heat equation and introducing the properties of the heat equation
- Finite difference methods
- Finite element methods
- Stability and convergence concepts
- Forward and backward finite difference schemes, weighted schemes, Dufort-Frankel scheme
- ADI approach for solving two-dimensional problems
- Numerical solution of one-dimensional advection-diffusion equation using the idea of Pade approximation
- Introducing semi-analytical methods, a domain method and Transform differential method
- Monte Carlo method
- Numerical Solution of Stochastic Differential Equations

Reading Resources:

Evaluation: