

MATH 424, Section 0201, Fall 2016:

Introduction to the Mathematics of Finance

Time & Place MWF 11:00–11:50am in MTH B0421

Instructor Dr. T. von Petersdorff, office MTH 4409, e-mail tvp@math.umd.edu, office hours Tue 10–12 (or by appointment)

Textbook (not required) S. M. Ross: “An Elementary Introduction to Mathematical Finance”, 3rd edition, Cambridge University Press, 2011. I will not follow the textbook very closely, and I recommend that you take notes. I will make my own notes available.

Syllabus Corresponding sections in the textbook are given in parentheses.

- Introduction: Savings account, stocks, options, trading at stock exchange, investment strategies
- Interest rates and present value analysis (Ch. 4)
- Review of probability I: Discrete Random Variables (Ch. 1)
- Discrete (binomial) model for stock price (Ch. 6.2)
Pricing options by arbitrage, risk-neutral probabilities (Ch. 5, 6)
- Review of probability II: Continuous random variables, normal distribution, central limit theorem (Ch. 2)
- From random walks to Brownian motion, geometric Brownian motion (Ch. 3)
- Black-Scholes model and Black-Scholes formula, Hedging (Ch. 7)
- American and other options (Ch. 5.2, 8.3, 13), Monte-Carlo option pricing (Ch. 13.4)

Grading Policy The grade will be obtained from a weighted average of exams, homeworks, and final exam (see below). With a total percentage $\geq 90\%$, 80% , 70% , 60% you are guaranteed an A, B, C, D, respectively. These cutoffs may be lowered slightly.

2 Exams (Total 35%) Make-up exams will only be given for *legitimate* and *documented* absences according to the University Assessment Policy (www.testudo.umd.edu/soc/atedasse.html). You must notify me of any such absence as soon as possible.

Homeworks (Total 35%) There will be about 4 assignments, containing both theoretical problems and computer problems with Matlab. **If an assignment is late**, there will be a **penalty of 15% for each day** after the due date. You can **hand in assignments** either **in class**, or you can slide them **under the door of my office** (MTH 4409) until 9pm. You **must** write the **current time and date** on your assignment when you slip it under the door. The homeworks must be done individually by each student. Sharing of material (in particular code) or writing wrong submission times on your homework is considered academic dishonesty.

Final Exam (30%) The cumulative final exam will be on Fri, Dec. 16, 8:00–10:00am in MTH B0421

Matlab This course will use Matlab. You can download Matlab for free from terpware.umd.edu

Course Web Page www.math.umd.edu/~tvp/424 gives additional information about the course, e.g., hints for using Matlab and for the homework problems. Please check this web page regularly.