Mathematical Modeling in Economics

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Goals and Topics

Broad topic => plenty of options. My choice – a crash course on quantitative finance.

- Discounted cash flow valuation
- Capital budgeting decisions
- Bond valuation (including term structure of interest rates)
- Stock valuation (discounted dividend model)
- Portfolio theory
- CAPM, APT
- Derivatives?
- Market microstructure models?

Grading

- Formula for the final grade $S_{\text{final}} \in [0, 10]$:

$$S_{\text{final}} = 0.6 \times S_{\text{accm}} + 0.4 \times S_{\text{exam}}$$

- $S_{\text{exam}} \in [0, 10]$ is a grade for the final exam
- $S_{\text{accm}} \in [0, 10]$ is an average of three in-class control works (CWs):

$$S_{\text{accm}} = \frac{1}{3} S_{\text{CW1}} + \frac{1}{3} S_{\text{CW2}} + \frac{1}{3} S_{\text{CW3}}$$

- $10 \to 5$ point transfer system:

S_{final}, 10-point system	8-10	6-7	4-5	0-3
S_{final}, regular 5-point system	5	4	3	2 (Fail)

Structure of classes

- No distinct separation between lectures and seminars.
- Problems considered in class are likely to appear in the CW.
- A list of reference problems for self-control and references to the textbooks.
- Combined presentation: slides+handwriting => have paper for notes
- Check out the LMS for slides, texts, assignments etc

Reading list

The core texts are [1], [2], [3], [4]

[1] S. Ross, R. Westerfield, J. Jaffe, Corporate Finance with S&P card, McGraw-Hill Companies,Incorporated, 2009.
URL `https://books.google.ru/books?id=bMiCPwAACAAJ`

[2] A. Marcus, A. Kane, Z. Bodie, R. Jain, Investments, The McGraw-Hill/Irwin series in finance, insurance and real estate, McGraw-Hill Education, 2014.
URL `https://books.google.ru/books?id=4VMVnwEACAAJ`

[3] J. Hull, Options, Futures and Other Derivatives, Options, Futures and Other Derivatives, Pearson/Prentice Hall, 2009.
URL `https://books.google.ru/books?id=sEmQZoHoJCcC`

[4] J. Hasbrouck, Empirical Market Microstructure: The Institutions, Economics, and Econometrics of Securities Trading, Oxford University Press, 2007.
URL `https://books.google.ru/books?id=aaReNv846eMC`