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Datum	14. April 2025

## Course Syllabus

**SS 2025**

### Finanzcontrolling

#### Course Outline

The course provides an introduction to basic financial modelling principles which are relevant to corporations, governmental institutions as well as the banking and financial services industry. Topics covered include risk management methods including the areas of interest rate, market and credit risk. Topics are covered in the framework of random variables and stochastic processes. Basic principles of financial calculus are provided.

#### Prerequisites

Prerequisites are fundamental skills in statistics and probability (introductory statistics course for economists covering random variables and their distributions), as well as the contents of an introductory course in corporate finance ("Investition und Finanzierung"). This includes the valuation of bonds and stocks, net present value, capital market theory, asset pricing and capital structure theory as for example covered in:

- **Hillier et al.** or **Ross et al.:** "Modern Financial Management", Mc Graw Hill,
- **Wagner:** "Finance: Ein Leitfaden mit Aufgaben und Lösungen", Books on Demand.

#### Rules for Course Participation

This course is open to all Master students and designed for those who specialize in financial management and capital markets. It provides the basis e.g. for a master thesis in the topic

area of Accounting, Finance and Taxation. Participants are encouraged to actively participate. Also, discussion of the course contents is encouraged. Course contents will be applied in problem sessions and small case studies during the tutorial sessions of the course. It is strongly recommended to actively participate in these weekly problem sessions in order to gain technical acquaintance with the subject. Parts of the course material and references are in English. The lecture language is German. Hence, for course participation, basic knowledge of the German language is required.

## Timetable

The lecture room for Wednesday, 12:00–14:00, is to be announced. The weekly 45 minute tutorial session (“Übung”) typically takes place on Tuesday starting in the 2<sup>nd</sup> week of the semester. Details are announced on StudIP. The timetable for the lecture is as follows.

Session	Time	Topic	References
1	12:00-14:00	Introduction, key concepts, basic financial calculations	[H],[RW],[LJ]
2	12:00-14:00	Interest rate risk: Duration, convexity	[H],[RW],[SG],[LJ]
3 & 4	12:00-14:00	Introduction to stochastic processes and applications	[K],[N],[M],[EFM]
5	12:00-14:00	Markov chains, Credit risk applications	[K],[H],[BOW],[WS]
6	12:00-14:00	Stochastic increments, Brownian motion, jump processes	[E],[B],[H],[N],[M],[W]
7 & 8	12:00-14:00	Itô’s lemma: Formulation and examples	[E],[B],[H],[N],[M],[W]
9	12:00-14:00	Examples of SDEs in finance: Stock price processes, interest rates, stochastic volatility	[E],[B],[H],[N],[M],[W]
10 & 11	12:00-14:00	Black Scholes formula, fundamental theorem of asset pricing	[E],[B],[H],[N],[M],[W]
12	12:00-14:00	Risk management: Market risk	[H],[BIS],[EFM],[HW],[HPW]
13	12:00-14:00	Risk management: Credit risk	[SG],[BOW],[BIS],[EFM],[HPW]
14		Questions and answers	

	t.b.a.	Final Examination (5 ECTS): One hour written in-class final exam (60 points).	
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**References:** [Contents refer to the indicated course sessions.]

**Bank for International Settlements (2001):** The New Basel Capital Accord, Basel:  
[www.bis.org](http://www.bis.org) [BIS]

**Björk, T. (2004):** Arbitrage Theory in Continuous Time, Oxford University Press, Oxford [B]

**Bluhm, C., Overbeck, L., Wagner, C. (2003):** An Introduction to Credit Risk Modelling,  
Chapman and Hall, London [BOW]

**Duffie, D., Singleton K. J. (2003):** Credit Risk, Princeton University Press, Princeton [DS]

**Embrechts, P., Frey, R., McNeil, A. (2005):** Quantitative Risk Management, Princeton  
University Press, Princeton [EFM]

**Etheridge, A. (2002):** A Course in Financial Calculus, Cambridge University Press,  
Cambridge [E]

**Hartmann-Wendels, T. (2003):** Basel II: Die neuen Vorschriften zur Eigenmittelunterlegung  
von Kreditrisiken, Economica, Heidelberg [HW]

**Hartmann-Wendels, T., Pfingsten, A., Weber, M. (2004):** Bankbetriebslehre, Springer,  
Berlin [HPW]

**Hull, J.C. (2003):** Options, Futures and Other Derivatives, Prentice Hall, Upper Saddle River  
[H]

**Krengel, U. (2005):** Einführung in die Wahrscheinlichkeitstheorie und Statistik, Vieweg [K]

**Locarek-Junge, H. (1996):** Finanzmathematik: Lehr- und Übungsbuch, 3. Aufl., Oldenbourg,  
München Wien [LJ]

**Mikosch, T. (1998):** Elementary Stochastic Calculus, World Scientific, Singapore [M]

**Neftci, S. N. (2000):** An Introduction to the Mathematics of Financial Derivatives, 2nd. ed.,  
Academic Press, San Diego [N]

**Ross, S.A., Westerfield, R.W., Jaffe, J., Jordan B.D. (2008):** Modern Financial  
Management, 8<sup>th</sup> ed., McGraw-Hill, New York [RW]

**Spremann, K., Gantenbein, P. (2005):** Zinsen, Anleihen, Kredite, Oldenbourg, München  
Wien [SG]

**Waldmann, K.-H., Stocker U. M. (2004):** Stochastische Modelle, Springer, Berlin [WS]

**Wiersema, U. F. (2008):** Brownian Motion Calculus, Wiley, Chichester [W]