

Announcement WiSe 2025/26

Lecture in Insurance Mathematics

Actuarial Risk Theory

Prof. Dr. Matthias Scherer

Area: / Modulnr.: Insurance Mathematics / MA3442

Course Structure: Lecture: 2h Exercises: 1h

Content:

- I) Some auxiliary tools
 - a. Probability generating functions
 - b. Recursion formula for convolutions
 - c. Moment generating functions
 - d. Comparing risks
- II) The collective model
- III) The risk process
 - a. Poisson process
 - b. Compound Poisson process
- IV) Ruin theory in the classical risk model
 - a. Renewal theory
 - b. The Pollaczek-Khinchine formula
 - c. Asymptotic estimates of the ruin probability

Audience: MSc Mathematics, Mathematical Finance and Actuarial Science

Prerequisite: MA2402 Basic Statistics, MA2409 Probability Theory, MA4405 Stochastic Analysis, MA3405 Insurance Mathematics I

Literature:

Asmussen, S. (2000): Ruin Probabilities. World Scientific, Singapur.

Bühlmann, H. (2007): Mathematical Methods in Risk Theory. 2nd ed. Springer, Berlin.

Embrechts, P., Klüppelberg, C. and Mikosch, T. (1997): Modelling Extremal Events for Insurance and Finance. Springer, Berlin.

Kyprianou, A.E. (2014): Fluctuations of Lévy Processes with Applications: Introductory Lectures. 2nd ed. Springer, Berlin.

Mikosch, T. (2003): Non-Life Insurance Mathematics. Springer, Berlin.

Resnick, S.I. (2002): Adventures in Stochastic Processes. 3rd ed. Birkhäuser, Boston.

Certificate: Exam, 5 CP

Location and Time: See TUMonline