

Announcement SoSe 2026

Lecture in Actuarial Science

Insurance Mathematics 2

Prof. Dr. Matthias Scherer

Area: / Modulnr.: Insurance Mathematics 2 / MA3406

Course Structure: Lecture: 4h Exercises: 2h

Content: This course introduces the principles of life-insurance mathematics, pension mathematics, and health insurance mathematics. Traditional life insurance focuses on models for mortality, the creation of actuarial life tables, and discount factors to derive the present value of life insurance products, annuities, and endowment policies. The actuarial equivalence principle for determining premiums and reserves is introduced and expected values of payments under different insurance contracts are calculated. The course also describes modern probabilistic models. The basics of occupational pension schemes and the actuarial methods required to value pension liabilities are introduced. In particular, typical examples for occupational pension schemes (defined benefit plans, defined contribution plans, cash balance plans) are analyzed. Actuarial methods to value pension liabilities in the German regulation context are discussed as well as actuarial methods under international accepted accounting principles. Concerning health insurance, the lecture covers the economic and legal framework for private health insurance in Germany, provides an overview on most common covers / tariffs offered, discusses pricing and computation of reserves, and specific topics like the participation in surplus for premium reduction in old ages.

Prerequisite: MA1401 Introduction to Probability Theory, MA2402 Basic Statistics or MA0009 Einführung in der Wahrscheinlichkeitstheorie und Statistik

Literature: **Führer, C.; Grimmer A. (2006):** Einführung in die Lebensversicherungsmathematik, Verlag Versicherungswirtschaft, Karlsruhe.
Gerber, H.U.; Hickman, J.C.; Jones, D.A.; Nesbitt, C.J.; Bowers N.L. (1997): Actuarial Mathematics. Society of Actuaries, second edition.
Gerber, H.U. (1997): Life Insurance Mathematics, second edition; Springer.
Koller, M. (1999): Stochastische Modelle in der Lebensversicherung, Springer.
H. Milbrodt (2005): Aktuarielle Methoden der deutschen Privaten Krankenversicherung, Schriftenreihe Angewandte Versicherungsmathematik, Heft 34, Verlag Versicherungswirtschaft.
Moller, T.; Steffensen M. (2007): Market-Valuation Methods in Life and Pension Insurance. International Series on Actuarial Science. Cambridge Univ Pr. Schriftenreihe Angewandte

Certificate: Exam, 9 CP

Location/ Lecture/Exercises: see TUMonline