

Health Insurance Mathematics

2nd Semester 2016/2017

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Course description:

Multiple state models and multiple decrement models provide a powerful tool for application in many areas of actuarial science, particularly in the actuarial assessment of sickness and disability income benefits. The aim of this course is to introduce the theory of multiple state models emphasizing their essential ideas and concepts. This powerful mathematical framework, based on Markov and semi-Markov stochastic processes, is used to describe and analyze disability and related insurance benefits. During the course we focus on disability and related benefits rather than conventional life insurance. Students interested in the latter subject area should take Life Insurance Mathematics course.

During Health Insurance Mathematics course the time-continuous as well as time-discrete approach to multiple state models for life and other contingencies is presented. We start with description of basic notions and tools for time-continuous and time-discrete Markov processes. Then, based on Markov processes theory, methods of construction increment-decrement life tables, calculation of actuarial values of benefits, premiums and reserves are presented. In particular, three general models and their modifications are studied- health insurance model, disability insurance model and model for critical illness cover. Beside solving theoretical problems, at the end of the semester students solve practical case study using tools learned during the course.

Prerequisites:

Probability; Life Insurance Mathematics.

Tentative list of topics:

- Multiple state models
- Continuous-time insurance contracts
- Discrete-time insurance contracts
- Health insurance models
- Disability insurance models
- Models for critical illness cover

Recommended Texts:

- Haberman, S. and Pitacco, E. (1999) Actuarial models for disability insurance. Chapman & Hall/CRC: New-York.
- Rotar, V. (2007), Actuarial Models, The Mathematics of Insurance. Ed. Chapman & Hall/CRC.