Course Unit Descriptor

Study Programme: Applied Mathematics (MB)

Course Unit Title: Actuarial Mathematics

Course Unit Code: MB41

Name of Lecturer(s): Dora Đ. Seleši, full professor

Type and Level of Studies: Master Academic Degree

Course Status (compulsory/elective): Elective

Semester (winter/summer): Summer

Language of instruction: English

Mode of course unit delivery (face-to-face/distance learning): Face-to-face

Number of ECTS Allocated: 7.5

Prerequisites: None

Course Aims:

Acquiring basic knowledge and skills in actuarial mathematics and learning contemporary actuarial models that are used in insurance companies.

Learning Outcomes:

At the end of the course students must demonstrate comprehension and knowledge of theoretical fundaments as well as practical skills and competence needed for a further carrier e.g. in insurance companies.

Syllabus:

Theory

Types of insurable risks: property insurance, life insurance, pension funds. Principles of premium calculation. Classes of random variables and their distribution laws. Models for the number of claims and severity of the claims. Individual and aggregate risk models. The Panjer recursion theorems. Impact of deductibles and policy limits onto the number of claims and insurance payments. Reinsurance. Statistical methods for optimal model selection. Credibility theory: American and European credibility models. Ruin theory: the Lundberg model, integrodifferential equations and approximation with Brownian motion. Extreme risk models.

Practice

The exercises follow the topics covered at the theoretical lectures. Solving examples, exercises and real world problems.

Required Reading:

1. Stuart A. Klugman, Harry H. Panjer, Gordon E. Willmot*, Loss Models – From Data to Decisions*, Second Edition, John Wiley & Sons Inc., Hoboken, New Jersey, 2004.
2. David C. M. Dickson, *Insurance Risk and Ruin*, International Series on Actuarial Science, Cambridge University Press, 2005.
3. Newton L. Bowers Jr., Hans U. Gerber, James C. Hickman, Donald A. Jones, Cecil J. Nesbitt, *Actuarial Mathematics*, Second Edition, The Society of Actuaries, Schaumburg, Illionois, 1997.
4. Promislow D., *Fundamentals of Actuarial Mathematics*, Wiley, 2006.

Weekly Contact Hours: 4	**Lectures:** 2	**Practical work:**

Teaching Methods:

Lectures are presented using classical teaching methods and occasionally supported by beamer presentations. Exercises are used to practice and analyze typical problems and their solutions, to discuss the topics covered at theoretical lectures

and to practically implement actuarial models using computers and statistical software.			
Knowledge Assessment (maximum of 100 points): 100			
Pre-exam obligations	points	**Final exam**	points
Active class participation		written exam	
Test I and Test II		oral exam	50
Preliminary exam(s)	50	…….	
Seminar(s)			
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			