

Actuarial Methods - course description

General information	
Course name	Actuarial Methods
Course ID	11.5-WK-MATD-MA-W-S14_pNadGenG9Y45
Faculty	Faculty of Mathematics, Computer Science and Econometrics
Field of study	Mathematics
Education profile	academic
Level of studies	Second-cycle studies leading to MS degree
Beginning semester	winter term 2019/2020

Course information	
Semester	2
ECTS credits to win	7
Course type	optional
Teaching language	polish
Author of syllabus	<ul style="list-style-type: none">dr hab. Mariusz Michta, prof. UZ

Classes forms					
The class form	Hours per semester (full-time)	Hours per week (full-time)	Hours per semester (part-time)	Hours per week (part-time)	Form of assignment
Lecture	30	2	-	-	Exam
Class	30	2	-	-	Credit with grade

Aim of the course

Knowledge about selected topics on actuarial and insurance mathematics: mortality models, net premium calculations, reserves, collective risk model, ruin probability.

Prerequisites

Mathematical analysis, probability theory, introduction to financial mathematics, foundations of stochastic analysis.

Scope

1. Mortality models, survival probability, life tables.
2. Life insurances payable at the moment of death.
3. Life insurances payable at the end of the term of death.
4. Single net premiums and relationships between different kinds of insurances.
5. Life annuities and their single net premiums.
6. Commutation function formulas for annuities and insurances.
7. Net premiums: fully continuous and discrete.
8. Net premium reserves: prospective and retrospective formulas.
9. Multiple life functions: the joint-life status and the last-survivor status. Insurances and annuities.
10. Multiple decrement models-basic kinds of insurances and premium calculations.
11. Collective risk models. Lundberg's risk model and Cramer-Lundberg's estimation of ruin probability.

Teaching methods

Lectures: actuarial and insurance mathematics: mortality models, net premium calculations, reserves, collective risk model, ruin probability.

Classes: exercises.

Learning outcomes and methods of their verification

Outcome description	Outcome symbols	Methods of verification	The class form
Students are able to estimate expected value of future-lifetime and to use life-tables for net-premium calculations.		<ul style="list-style-type: none">• activity during the classes• an exam - oral, descriptive, test and other	<ul style="list-style-type: none">• Lecture• Class
Students are familiar with international actuarial notation and different kinds of insurances; know basic analytical mortality, equivalence principle for net-premium and mathematical aspects of classical risk theory.		<ul style="list-style-type: none">• activity during the classes• an exam - oral, descriptive, test and other	<ul style="list-style-type: none">• Lecture• Class

Assignment conditions

Evaluation of individual exercises, final exam and grades.

Recommended reading

1. M. Skarba, Ubezpieczenia na życie, WNT, Warszawa, 2002.
2. T. Rolski, B. Błaszczyszyn, Podstawy matematyki ubezpieczeń na życie, WNT, Warszawa, 2005.
3. N. Bowers, H.U. Gerber et al, Actuarial Mathematics, Soc. of Actuaries, Illinois, 1986.
4. J. Grandell, Aspects of Risk Theory, Springer, Berlin,1992.

Further reading

1. W. Ronka-Chmielowiec, Ryzyko w ubezpieczeniach-metody oceny, AE, Wrocław, 1997.
2. M. Dobija, E. Smaga, Podstawy matematyki finansowej i ubezpieczeniowej, WNT, Warszawa,
3. H. U. Gerber, Life Insurance Mathematics, Springer, Berlin,1990.

Notes

Modified by dr Alina Szelecka (last modification: 03-07-2019 12:29)

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