

Subject card

Subject name and code	Life Insurance Mathematics, PG_00206876						
Field of study	Mathematics						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2026/2027		
Education level	Master's studies		Subject group		Obligatory subject group in the field of study Optional subject group Subject group related to scientific research in the field of study		
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		5.0		
Learning profile	academic		Assessment form		exam		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr Milena Matusik				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	30.0	0.0	0.0	0.0	60
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	60		3.0		62.0	125
Subject objectives	To introduce students to basic concepts and facts in the mathematics of life insurance.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[MATMU2_U04] is able to apply the scientific method in solving advanced problems in a selected branch of mathematics or its applications, and appropriately selects methods and tools - mathematical or computer - needed to solve such problems		The student knows the basic models of life insurance and, with appropriate selection of literature, is able to solve advanced problems related to the mathematics of life insurance.		[SU2] presentation/project/paper/report [SU4] test/exam - oral or written		
	[MATMU2_W03] knows and understands to a deep degree a selected field of theoretical or applied mathematics and is able to understand the formulations of issues in this field that are still at the research stage and knows the connections between issues in this field and other areas of mathematics		The student has in-depth theoretical knowledge of results and arguments in the field of life insurance mathematics.		[SW1] oral statement/conversation/discussion [SW2] presentation/project/paper/report		

Subject contents	1. Elementary topics in financial mathematics - interest rates, standard payment sequences. 2. Life expectancy - fractional life expectancy and its interpolation. 3. Life insurance - single net premium in continuous and discrete insurance. 4. Life annuities - actuarial present value of continuous and discrete annuities. 5. Standard insurance and net premiums. 6. Net mathematical reserves - loss sharing in annual policies, Hattendorff's theorem. 7. Multiple losses, group policies. 8. Commutation functions. 9. Gross mathematical reserves.		
Prerequisites and co-requisites	Possess knowledge of mathematical analysis I, II and probability theory.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	observation of the student's attitude	51.0%	0.0%
	project	51.0%	20.0%
	test	51.0%	40.0%
	written exam	51.0%	40.0%
Recommended reading	Basic literature	1. J. Czarnowska, K. Dziedziul, Ubezpieczenia na życie i komunikacyjne, Wyd. Politechniki Gdańskiej, 2010. 2. B. Błaszczyszyn, T. Rolski, Podstawy matematyki ubezpieczeń na życie, WNT, 2004. 3. N. Bowers, H. Gerber, J. C. Hickman, D. A. Jones, C. J. Nesbitt, Actuarial Mathematics, The Society of Actuaries, 1986. 4. H. Gerber, Life insurance mathematics, Springer, 1995. 5. A. Leung, Actuarial Principles. Lifetables and mortality models, Academic Press, 2022.	
	Supplementary literature	1. M. Skałba, Ubezpieczenia na życie, WNT, 1999. 2. P. Jaworski, J. Micał, Modelowanie matematyczne w finansach i ubezpieczeniach, Poltext, 2005.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	None.		
Work placement	Not applicable		

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