

Subject card

Subject name and code	Elements of Financial Mathematics, PG_00154354						
Field of study	Insurance - Interdisciplinary Studies						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2025/2026		
Education level	Master's studies		Subject group		Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
Mode of study	part-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		3.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Department of Econometrics -> Faculty of Management -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Ewa Wycinka				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	10.0	10.0	0.0	0.0	0.0	20
	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	20		10.0		45.0	75
Subject objectives	Understanding the principles of calculating the value of capital over time. Using the learned principles to: determine the value of capital at any given moment, update a series of payments to any point in time (planning regular savings and withdrawals), prepare a debt repayment plan.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[UBEZMU2_W08] The student knows the methods and tools, including data and information acquisition techniques, appropriate to the field of insurance and related disciplines.	Students will be familiar with methods for calculating the value of capital at any moment in nominal and real terms and methods for updating the payment sequence at any moment.	[SW4] test/exam - oral or written
	[UBEZMU2_U01] The student has in-depth skills of observation and interpretation of phenomena related to economic and legal aspects of insurance, including the use of advanced information and communication techniques, and is able to integrate knowledge from various scientific disciplines.	The student is able, in compliance with the principles of financial mathematics, to calculate the value of capital at any point in time, taking inflation into account, to plan regular savings and withdrawals from accumulated capital, to draw up a loan repayment plan.v	[SU4] test/exam - oral or written
	[UBEZMU2_K03] The student thinks creatively, is able to go beyond the usual patterns, is able to think and act in an entrepreneurial manner, is able to adapt flexibly to the requirements of the environment.	The student has the ability to make financial decisions based on mathematical analysis to evaluate different investment and financial strategies.	[SK4] test/exam - oral or written
	[UBEZMU2_U06] The student is able to independently plan and implement his/her own lifelong learning and lead others in doing so.	Students are able to independently improve their knowledge of financial mathematics.	[SU4] test/exam - oral or written
	[UBEZMU2_U03] The student has developed skills to understand and analyze socio-economic phenomena, including by formulating and testing hypotheses related to insurance research problems.	The student has the ability to perform financial analysis of various investment instruments and projects	[SU4] test/exam - oral or written
	[UBEZMU2_K01] The student is critically aware of the level of his knowledge and skills, recognizes the importance of knowledge in solving cognitive and practical problems in the field of insurance, consults experts in case of difficulties in solving the problem independently.	he student understands the need to continuously improve and expand the acquired knowledge; he/she is prepared to further expand his/her knowledge in the field of financial mathematics. He/she is able to communicate his/her knowledge and share his/her skills.	[SK4] test/exam - oral or written
Subject contents	1. Principle of simple interest revaluation of capital, equivalence of capitals, average interest rate, real simple discount, commercial (bank) simple discount, condition of equivalence of interest and discount rate, principles of bill of exchange clearing. 2. Principle of compound interest revaluation of capital, equivalence of capital, equivalence of interest terms, nominal and effective interest rate, average interest rate, interest intensity, compounded real discount, compounded commercial discount, interest rate and discount rate equivalence condition. 3. Impact of inflation on the purchasing power of capital monthly, quarterly and annual inflation rates, average inflation rate, real interest rate, real value of capital. 4. Annuity accounting for time and perpetual annuities, annuities payable in arrears and in advance, deferred annuities, value of annuities at any point in time, equivalence of annuities, planning regular savings and withdrawals from capital. 5. Debt repayment by instalments of interest and principal, debt repayment plan with fixed payment amounts, debt repayment plan with fixed capital instalments. 6. Test		
Prerequisites and co-requisites			

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	colloquium	51.0%	100.0%
Recommended reading	Basic literature	1. Bieszk-Stolorz B., Matematyka finansowa z arkuszem kalkulacyjnym, CEDEWU, Warszawa 2021. 2. Wycinka E., Szreder M. (red.), Zastosowanie metod ilościowych w ubezpieczeniach, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 2020. 3. Redo M., Prewszyn-Kwitno P., Matematyka finansowa. Teoria i praktyka, PWN, Warszawa 2021.	
	Supplementary literature	1. Adamczak A., Majerowska M., Matematyka finansowa w przykładach, WSFiR, Sopot 2003; 2. Dobija M., Smaga E., Podstawy matematyki finansowej i ubezpieczeniowej, PWN 1995; 3. Kozubski J., Matematyczne modelowanie wybranych procesów finansowych, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk, 2002; 4. Podgórska M., Klimkowska J., Matematyka finansowa, PWN, Warszawa 2005; 5. Sobczyk M., Matematyka finansowa, Agencja Wydawnicza Placet, Warszawa 2000	
	eResources addresses		
	Example issues/ example questions/ tasks being completed		
Work placement	Not applicable		

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