

Subject card

Subject name and code	Introduction to Financial Mathematics, PG_00172743						
Field of study	Mathematical Modeling and Data Analysis						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2026/2027		
Education level	Bachelor'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		6.0		
Learning profile	academic		Assessment form		exam		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr Marta Frankowska				
	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		10.0		80.0	150
Subject objectives	Familiarize students with the structure of interest rates, issues related to the analysis and modeling of financial flows.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[MMiADL3_U05] is able to plan a way to solve a complex problem and prepare a correct record of this solution, providing strict and precise justification for the correctness of his/her reasoning		The student is able to plan and carry out the solution of complex problems in financial mathematics by applying appropriate models of capital accumulation and discounting, annuity and loan models, and investment appraisal methods, and to present solutions in a mathematically rigorous and accurate manner, providing precise justification for the correctness of the reasoning involved.		[SU4] test/exam - oral or written		
	[MMiADL3_W05] knows and understands the structure of selected mathematical theories, is able to use mathematical formalism to build and analyze mathematical models also in other fields of science		The student knows and understands the structure of selected mathematical theories underlying financial processes and is able to use mathematical formalism to construct, analyze, and interpret models of capital accumulation and discounting, annuities, loans, and investment appraisal, as well as to apply these models to describe and solve problems arising in finance and other areas of application.		[SW4] test/exam - oral or written		

Subject contents	1. Basic concepts of financial mathematics and the time value of money. 2. Capital accumulation models and interest rates. 3. Interest and discounting under various models. 4. Time value adjustment of capital. 5. Financial annuities and their characteristics. 6. Loan repayment models. 7. Basic concepts and methods of investment analysis and appraisal.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	written exam	51.0%	60.0%
	colloquium	51.0%	40.0%
	observation of the student's attitude	100.0%	0.0%
Recommended reading	Basic literature	1. M. Podgórska, J. Klimkowska Financial Mathematics, PWN, Warsaw, 2005. 2. Capital Markets. Financial mathematics I, P. Jaworki, K. M. Jaworska.	
	Supplementary literature	1. Financial engineering, R. Weron, WNT, Warsaw, Poland. 2. Mathematical modeling in finance and insurance, P. Jaworski, J. Micał, Poltext, Warsaw 2005.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	1. Capital accumulation processes (simple interest, compound interest, continuous capitalization, annual and subperiodic interest rate, nominal and effective rate, minimum and maximum interest). 2. Trade discount, treasury bills, bills of exchange. 3. Inflation, real interest rate and real value of capital. 4. Time value of capital model, principle of equivalence of capitals. 5. Annuities payable in arrears and payable in advance, deferred annuities, perpetual annuities, annuities with fixed installments, annuities with variable installments: series of fixed, forming an arithmetic and geometric series, generalized annuity type I and II. 6. Loans, the principle of equivalence of debt and installments, different models of loan repayment, mortgages - WIBOR-dependent rate, loan repayment plan. 7. Measures for evaluating financial investments - NPV (net present value of investment) and IRR (internal rate of return).		
Work placement	Not applicable		

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