

Subject card

Subject name and code	Mathematics II, PG_00156265						
Field of study	Informatics and Econometrics						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2024/2025		
Education level	Bachelor's studies		Subject group		Obligatory subject group 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				
Conducting unit	Department of Econometrics -> Faculty of Management -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Juliusz Giżyński				
	Teachers		mgr Tomasz Jastrzębski dr Anna Gierusz-Matkowska dr hab. Beata Jackowska				
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		20.0		70.0	150
Subject objectives	To learn the principles of calculating the time value of capital. Use the principles learned to: determine the value of capital at any point in time, update the sequence of payments at any point in time, prepare a debt repayment plan, evaluate investment projects, value debt instruments, basic actuarial calculations.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[liEL3_W04] The student has advanced knowledge of mathematical, statistical, econometric and computer methods of obtaining, processing and analysing data depicting the functioning and development of the national economy and its elements, as well as the phenomena and processes occurring in their environment.	The student knows and understands the applications of mathematical methods in finance and banking.	[SW4] test/exam - oral or written [SW5] implementation of a problem task
	[liEL3_W05] The student has advanced knowledge of the sources of socio-economic data, their databases and ways of creating them.	The student has knowledge of obtaining data on interest rates on capital in the financial market.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion [SW5] implementation of a problem task
	[liEL3_K02] The student can communicate with the public on computer science and econometrics topics in and outside the workplace, communicate his knowledge and share his skills through various media.	The student is able to present the solution to a financial mathematics problem to the group in an understandable, accessible manner.	[SK1] oral statement/conversation/discussion
	[liEL3_K01] The student understands the need to constantly supplement and deepen acquired knowledge; is open to new ideas and teaching methods.	The student understands the need to deepen knowledge and acquire skills in mathematics and its applications in finance.	[SK1] oral statement/conversation/discussion
	[liEL3_U07] The student can build formal models of complex economic phenomena and processes, estimate them, carry out their verification, and apply them to modelling, forecasting and optimization of the resources of low-complexity economic institutions, their structure and the course of processes in them.	The student is able to value financial instruments using the discounted cash flow method.	[SU4] test/exam - oral or written [SU5] implementation of a problem task
Subject contents	1. Simple interest: actualization of capital value, equivalence of capitals, average interest rate, account in sta and from hundred, real discount simple, commercial (bank) discount simple, condition of equivalence of interest rate and discount rate, principles of settlement of bills of exchange. 2. Compound interest: capital revaluation, equivalence of capitals, equivalence of interest terms, average interest rate, interest intensity, real compounding discount, commercial compounding discount, condition of equivalence of interest and discount rate. Effect of inflation on the purchasing power of capital: periodic inflation rate, average inflation rate, real value of capital. 3. Accounting for annuities: time and perpetual annuity, annuity payable in arrears and in advance, deferred annuity, compatible and incompatible annuity, annuity with fixed installments, annuity with variable installments, value of annuity at any time, equivalence of annuities. 4. Installment repayment of debts: interest and principal repayments, debt repayment plan with fixed principal installments, debt repayment plan with fixed payment amounts, delayed repayment loans, cost of debt. 5. Investment project evaluation methods: flow design, average duration, payback period, net investment return ratio internal rate of return, modified internal rate of return, investment project acceptance criteria. 6. Valuation of financial instruments by discounted cash flow method. 7. Statistical measures of description of distributions of insurance characteristics, market concentration (essence of market concentration, selected concentration indices, concentration curves), modeling of insurance phenomena by means of probability distributions.		
Prerequisites and co-requisites	A. Prerequisites Students should have elementary knowledge of mathematical analysis, probability calculus and statistics. B. Formal requirements Knowledge of the following subjects: mathematics I, statistics I.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Two written colloquia	51.0%	100.0%

Recommended reading	Basic literature	A.1. <i>used during classes:</i> 1. Podgórska M., Klimkowska J., Matematyka finansowa, PWN, Warszawa 2000. 2. Sobczyk M., Matematyka finansowa, Agencja Wydawnicza Placet, Warszawa 2000. 3. Wycinka E., Szreder M. (red.), Zastosowanie metod ilościowych w ubezpieczeniach, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 2020. 4. Bieszk-Stolorz B., Matematyka finansowa z arkuszem kalkulacyjnym, CeDeWu, Warszawa 2021. A.2. <i>studied independently by the student:</i> 1. Redo M., Prewszyn-Kwitno P., Matematyka finansowa. Teoria i praktyka, PWN, Warszawa 2021.
	Supplementary literature	1. Dobija M., Smaga E., Podstawy matematyki finansowej i ubezpieczeniowej, PWN 1995. 2. Kozubski J., Matematyczne modelowanie wybranych procesów finansowych, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk, 2002.
	eResources addresses	Basic https://bg.ug.edu.pl/e-biblioteka/e-ksiazki - Library of the University of Gdansk
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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