

Subject card

Subject name and code	Mathematics for Economics, PG_00156809						
Field of study	Finance and Accounting						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2024/2025		
Education level	undergraduate 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	full-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	1		ECTS credits		6.0		
Learning profile	academic		Assessment form				
Conducting unit	Katedra Ekonometrii -> Faculty of Management						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Juliusz Giżyński				
	Teachers		mgr Agata Majkowska Karolina Diakowska dr hab. Beata Jackowska mgr Tomasz Jastrzębski				
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		16.0		74.0	150
Subject objectives	To equalize the level of students' knowledge, and then develop the knowledge of mathematical methods necessary for further education. To learn about the applicability of mathematical methods in economics.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[FiRL3_K05] Responsibility: - meets deadlines - is able to properly identify priorities for the implementation of the task set by him - consistently strives to achieve the set goal - is able to work systematically and independently - observes the rules and norms of social coexistence.	The student is able to work systematically and independently in the field of mathematics and its applications in economics.	[SK1] oral statement/conversation/discussion
	[FiRL3_W08] The student knows the principles of evaluating projects in the field of finance (profitability of investment projects, assessment of the financial situation of the organization, risk assessment, threat of bankruptcy).	The student knows and understands the methods of linear algebra and mathematical analysis necessary for further education in all courses at the UG Faculty of Management.	[SW4] test/exam - oral or written [SW5] implementation of a problem task
	[FiRL3_W06] The student has advanced knowledge of methods and tools, including data acquisition and analysis techniques, appropriate to management science and quality, which allow describing economic structures and institutions and the processes within and between them.	The student knows the possibilities of application of mathematical methods in economics. The student has knowledge of obtaining data on interest rates of capital in the financial market.	[SW4] test/exam - oral or written [SW5] implementation of a problem task
	[FiRL3_K01] Self-development: - understands the need for development and lifelong learning - is able to supplement and improve the acquired knowledge and skills - knows his strengths and weaknesses, sets ambitious goals to the best of his ability - knows how to accept failure and admit mistakes.	The student understands the need to deepen knowledge and acquire skills in mathematics and its applications in economics.	[SK1] oral statement/conversation/discussion
	[FiRL3_U02] The student can acquire data from various sources to analyze specific economic processes and phenomena related to finance. Is able to use information technologies.	The student is able to obtain relevant mathematical data on financial phenomena, using modern computer tools, such as Microsoft Excel.	[SU5] implementation of a problem task
	[FiRL3_U03] The student can properly analyse the causes, course and effects of specific processes and phenomena in finance and accounting, using advanced theories and relevant social sciences methods. Can identify stakeholders of processes and phenomena from the disciplines of management and quality sciences and economics and finance.	The student is able to represent selected economic issues in matrix form and perform basic operations on these matrices. He can use differential calculus in selected economic issues.	[SU4] test/exam - oral or written [SU5] implementation of a problem task
	[FiRL3_K06] Creativity: - 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 is able to present an issue in mathematics and its applications in economics in a way that others can understand, and is not afraid to ask questions.	[SK1] oral statement/conversation/discussion

Subject contents	Elements of linear algebra: 1. Matrices: the concept of matrices, types of matrices, operations on matrices and their properties, determinant of a square matrix and its properties, elementary operations on matrices, determination of the inverse matrix. Examples of applications of matrices in economic issues. 2. Systems of linear equations: matrix form of a system of linear equations, solving systems of linear equations (marked, indeterminate, contradictory). Examples of systems of linear equations in economic problems. Elements of mathematical analysis: 3. Number sequences: monotonicity of sequences, arithmetic and geometric sequences, limits of sequences, convergent and divergent sequences, sequences converging to the number e. 4. Functions of one variable: examples of function relationships in economics, limit of a function. Differential calculus of functions of one variable: differential quotient, derivative of a function at a point, geometric interpretation of the derivative, properties of the derivative, derivatives of higher orders, monotonicity of a function vs sign of the derivative, necessary and sufficient condition for the existence of a local extremum of a function, largest and smallest value of a function. Examples of the use of differential calculus in economics. Financial mathematics: 5. Simple interest: capital revaluation, average interest rate, calculus in sta and from hundred, real discount simple, commercial (bank) discount simple. 6. Compound interest: capital revaluation, equivalence of capitals, equivalence of interest terms, nominal interest rate, effective interest rate, interest intensity, average interest rate, compound real discount, compound commercial discount, interest rate and discount rate equivalence condition. Effect of inflation on the purchasing power of capital: periodic inflation rate, average inflation rate, real value of capital. 7. Annuity accounting: time and perpetual annuity, annuity payable in arrears and in advance, deferred annuity, annuity with fixed installments, value of annuity at any time. 8. Installment repayment of debts: interest and principal repayments, debt repayment plan with fixed principal installments and with fixed payment amounts, loans with delayed repayment period, cost of debt.		
Prerequisites and co-requisites	The student should have basic high school mathematical knowledge.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Credit on the basis of partial tests (colloquia) on tasks and theory from exercises and lectures, as well as activity in class.	51.0%	100.0%
Recommended reading	Basic literature A. Literature required for final course credit (passing the exam) A1. Mathematics: 1. Bazańska T., Nykowska M., Matematyka w zadaniach dla wyższych zawodowych uczelni ekonomicznych, Wydawnictwo Branta 2003. A2. Financial Mathematics: 2. Podgórska M., Klimkowska J., Matematyka finansowa, PWN, Warszawa 2000. 3. Wycinka E., Szreder M. (red.), Zastosowanie metod ilościowych w ubezpieczeniach, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 2020 (rozdz. 8-11).		

	Supplementary literature	B. Supplementary literature B1. Mathematics: 1. Bednarski T., Elementy matematyki w naukach ekonomicznych, Oficyna Ekonomiczna, Kraków 2004. 2. Chiang A. C., Podstawy ekonomii matematycznej, PWN, Warszawa 1994. 3. Krysicki W., Włodarski L., Analiza matematyczna w zadaniach, część I i II, PWN, Warszawa 2003. 4. Małłoka M. (red), Matematyka dla ekonomistów, Wydawnictwo AE w Poznaniu, Poznań 2000. 5. Piszczala J., Matematyka i jej zastosowanie w naukach ekonomicznych, Wydawnictwo AE w Poznaniu, Poznań 1998. 6. Piszczala J., Piszczala M., Wojcieszyn B., Matematyka z zadaniami, PWN, Warszawa 1981. 7. Sadowski M, Spanily T., Matematyka w zadaniach dla studentów kierunków ekonomicznych, Wydawnictwo UG, Gdańsk, 1999. B2. Financial Mathematics: 8. Dobija M., Smaga E., Podstawy matematyki finansowej i ubezpieczeniowej, PWN 1995. 9. Bieszk-Stolorz B., Matematyka finansowa z arkuszem kalkulacyjnym, CEDEWU, Warszawa 2021. 10. Kozubski J., Matematyczne modelowanie wybranych procesów finansowych, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk, 2002. 11. Redo M., Prewszyn-Kwitno P., Matematyka finansowa. Teoria i praktyka, PWN, Warszawa 2021. 12. Sobczyk M., Matematyka finansowa, Agencja Wydawnicza Placet, Warszawa 2000.
	eResources addresses	Podstawowe https://bg.ug.edu.pl/e-biblioteka/e-ksiazki - Library of the University of Gdansk Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

Document generated electronically. Does not require a seal or signature.