University of Gdańsk

Subject card

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| Subject name and code | Mathematics for Economics, PG_00178594 | | |
| Field of study | Finance and Accounting | | |
| 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 |
| Mode of study | full-time studies | Mode of delivery | at the university |
| Year of study | 1 | Language of instruction | English |
| Semester of study | 1 | ECTS credits | 6.0 |
| Learning profile | academic | Assessment form | credit |
| Conducting unit | Department of Econometrics -> Faculty of Management -> Rector | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr Marta Chylińska | |
| | 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 | 4.0 | 86.0 | 150 |

**Subject objectives**

The aim of the course is to provide students with an understanding of the mathematical knowledge for finance and investment. The course gives students skills for implementation of the mathematical knowledge and expertise to the problems of finance and investment. Its prerequisites are both the knowledge of the single variable calculus and the foundations of linear algebra including operations on matrices and the general theory of systems of simultaneous equations.

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [FiRL3_U02] The student can identify, analyze or design adequate solutions to problems in finance and accounting. | The student is able to determine priorities for solving mathematical problems, independently solve mathematical tasks | [SU4] test/exam - oral or written |
| [FiRL3_W02] The student has advanced knowledge and understanding of the functioning of the domestic and international financial market and financial instruments and institutions. | The student knows advanced mathematical tools appropriate to the science of management and quality. | [SW4] test/exam - oral or written |

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| Subject contents | 1. Matrix algebra: Matrices and Vectors, Matrix Operations, Commutative, Associative and Distributive Laws, Identity and Null Matrices, Transposes and Inverses, Conditions for Nonsingularity of a Matrix, Basic Properties of Determinants.<br>2. Linear Models and Matrix Algebra: Finding the. Inverse Matrix, Cramers Rule, Application to Market and National-Income Models, Limitations of Static Analysis<br>3. Functions, Graphs, and Models: Functions and Models, Finding Domain and Range, Slope and Linear Functions, Nonlinear Functions and Models, Mathematical Modeling and Curve Fitting.<br>4. Differentiation: Limits: A Numerical and Graphical Approach, Algebraic Limits and Continuity, Average Rates of Change, Differentiation Using Limits of Difference Quotients, Differentiation Techniques: The Power and SumDifference Rules, Differentiation Techniques: The Product and Quotient Rules, The Chain Rule, Higher-Order Derivative.<br>5. Applications of Differentiation: Using First Derivatives to Find Maximum and Minimum Values and Sketch Graphs, Using Second Derivatives to Find Maximum and Minimum Values and Sketch Graphs, Graph Sketching: Asymptotes and Rational Functions, Using Derivatives to Find Absolute Maximum and Minimum Values, MaximumMinimum Problems, Business and Economics Applications, Marginals and Differentials, Implicit Differentiation and Related Rates.<br>6. Integration: Antidifferentiation, Antiderivatives as Areas, Area and Definite Integrals, Properties of Definite Integrals, Integration Techniques Substitution and by Parts.<br>7. Applications of Integration: Consumer Surplus and Producer Surplus, Integrating Growth and Decay Models, Improper Integrals, Probability and Expected Value, The Normal Distribution. |
| Prerequisites and co-requisites | Basic algebra concepts, such as properties of exponents, multiplying and factoring polynomials, equation solving |
| Assessment methods and criteria | |

| Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|
| 2 written tests | 51.0% | 100.0% |

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| Recommended reading | Basic literature | 1. Bittinger M.L., Ellenbogen D.J., Surgent S.A., Calculus and its aplications, Pearson Addison-Wesley, 2012<br>2. Gruber M.H.J., Matrix Algebra for Linear Models, Wiley, 2013 |
| | Supplementary literature | 1. Chiang A.C., Fundamental methods of mathematical economics, McGraw-Hill, 1984. |
| | eResources addresses | |
| Example issues/ example questions/ tasks being completed | | |
| Work placement | Not applicable | |

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