COURSE PLAN

Course title	**Mathematics for Business and Economics**
Aims of the course	**The subject is basic course which aims to enable students to understand the basic definitions, theorems, principles and methods of Mathematical Economics in order to help them to understand other quantitative disciplines such as: Financial and Actuarial Mathematics, Microeconomics, Statistics, Operational Research, …**
Learning outcomes	**After completion of this course the student will be able to:** **1. Calculate a value of determinant and specify it properties.** **2. Define a matrix, conduct basic arithmetic operations with matrices and specify their properties.** **3. Determine and discuss solutions of system of linear equations and inequalities.** **4. Define a vector and arithmetic operations with vectors.** **5. Define the function and explain basic concepts of function of one variable, and to draw its graph.** **6. Define a derivative of the function of one variable, interpret it economically and geometrically** **7. Define and interpret the basic concepts of integral calculus and apply the definite integral to surfaces calculation and to solve economic problems, as well as to differential equations.** **8. Define the function of more variable and explain basic concepts, as well as to apply partial derivatives to extreme values determination.** **9. Interpret and explain theorems regarding the concepts learned.** **10. Applies learned concepts and theorems on economic phenomenon and create a simpler mathematical- economic models.**
List of topics/ name of the lecturer(including visiting lecturers and experts where applicable)	
Week I (2.10)	**Brief introduction to mathematical- economic modelling and to Financial mathematics.** **Linear algebra- matrices and determinants. Inverse matrix. Application to Leontief Input-Output model (2L- Lecture 1)** **Financial Mathematics (Proportion. Percentage. Simple and compound interest) (2E)**
Week II (9.10)	**Vectors. Linear dependence. Basis. System of linear equations. Cramer's rule. Gauss's algorithm. Rank. Kronecker- Capelli theorem. Application to Market and National-income models. (2L- Lecture 2)** **Linear algebra (2E)**
Week III (16.10)	**A real function of a real variable. Elementary functions- characteristics and graphics. Inverse and composite function. Limit of function. Euler's number e. Continuous function. Economic functions. (2L- Lecture 3)** **Linear algebra (2E)**
Week IV (23.10)	**Derivative- definition and geometric interpretation. Rules of differentiation- derivation of sum, product and quotient. Differentials. Higher derivatives. Chain rule. Inverse function rule. (2L- Lecture 4)**

	Linear algebra (2E)
Week V (30.10)	**Marginal function vs. Elasticity. Growth rate. L' Hospital's rule. Monotonic function. Extreme values. Convexity. Inflection point. (2L- Lecture 5)** **Calculus (2E)** **Quiz 1- date: 30.10.2025.**
Week VI (6.11)	**Types of function growth. Characteristics of functions. Graph. (2L- Lecture 6)** **Calculus (2E)**
Week VII (13.11)	**National Holiday- no classes**
Week VIII (20.11)	**Indefinite integrals- definition and properties. The substitution rule. Integration by parts. Integration of some rational functions. (2L- Lecture 8).** **Calculus (2E)** **Quiz 2- date: 20.11.2025.**
Week IX (27.11)	**Definite integral- definition. Newton-Leibniz formula. Geometric interpretation of definite integral. Economic applications. (2L- Lecture 9)** **Calculus (2E)**
Week X (4.12)	**First- order ordinary differential equations (ODE). Equations with separated variable. First order linear differential equations. (2L- Lecture 10)** **Midterm exam- date: 4.12.2025**
Week XI (11.12)	**Function of more than one variable (Multivariable calculus). Partial derivatives. Partial and cross-partial elasticity. Extreme values (free extrema). (2L- Lecture 11)** **Integrals (2E)**
Week XII (18.12)	**Extreme values (constrained relative extrema). Lagrange's function. Absolute extrema. (2L- Lecture 12)** **ODE (2E)** **Remedial midterm exam- date: 18.12.2025**
Week XIII (25.12)	**Repetition & Preparation for the final exam (2L)** **Several variables. Relative & absolute extrema (2E)**
Week XIV	**National Holiday- no classes**
Mandatory readings	**Alpha C. Chiang Kevin Wainwright Fundamental Methods of Mathematical Economics, 4th edition, McGraw-Hill, 2005.**
Semestral assessment	**Homeworks&Quizzes 10 points** **Midterm 40 points** **Final exam 50 points**
List of lecturers (academic)	**Vladimir Kašćelan, Full Professor** **Milan Raičević, Teaching Assistant**
Name of the course coordinator	**Vladimir Kašćelan, Full Professor**

List of visiting lecturers (experts),(where applicable)	**TBD**