## **COURSE PLAN**

Course title	Mathematics for Business and Economics
Aims of the	The subject is basic course which aims to enable students to understand the basic definitions, theorems,
course	quantitative disciplines such as: Financial and Actuarial Mathematics, Microeconomics, Statistics,
	Operational Researches,
Learning	After completion of this course the student will be able to: 1 Calculate a value of determinant and specify it properties
outcomes	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.
	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.
	8.Define the function of more variable and explain basic concepts, as well as to apply partial derivatives
	to extreme values determination.
	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	Mathematical- economic model. Equilibrium in the economy.
	Principle and methods of Financial mathematics. Proportion.
	Percentage. Arithmetic and geometric progression. (2L- Lecture 1)
	Linear models and matrix algebra- introduction. Matrices. Vectors.
	Vector space. Linear dependence. Basis. (2L- Lecture 2)
	NOTICE: In general, each week exercises (2E) follow the lectures
	(2L), except Week 1: 4L will be held.
Week II	Determinants. Inverse matrix. Cramer's rule. Application to Market
	and National-income models. Leontief Input-Output model.
	(Lecture 3)
Week III	Gaussian algorithm. Rank. Kronecker- Capelli theorem. Convex set.
	Hyperplane in the n-space. Linear inequality. System of linear
	inequalities. (Lecture 4)
Week IV	Quiz 1- date: 18.10.2023.
	NOTICE: After the quiz, this week 4E will be held.
Week V	The real function of a real variable. Elementary functions-
	characteristics and graphics. Inverse function. Composite function.
	Limit of function. Euler's number e. Continuous function. Economic
	functions. (Lecture 5)
Week VI	Derivative- definition and geometric interpretation. Rules of
	differentiation- derivation of sum, product and quotient.
	Differentials. Higher derivatives. (Lecture 6)
Week VII	Chain rule. Inverse function rule. Marginal function. Elasticity.
	Growth rate. (Lecture 7)
	Quiz 2- date: 8.11.2023.

Week VIII	Mean- value theorems. L' Hospital's rule. Monotonic function. Extreme values, Convexity, Inflection point, (Lecture 8)
Week IX	Types of function growth Characteristics of functions Granh
	Exercises. (Lecture 9)
Week X	Indefinite integrals- definition and properties. The substitution rule.
	Integration by parts. Integration of rational functions. (Lecture 10)
	Quiz 3- date 29.11.2023.
Week XI	Definite integral- definition. Newton-Leibniz formula. Geometric
	interpretation of definite integral. (Lecture 11)
	<b>TEST</b> (during 2E)- date: 6.12.2023
Week XII	First- order differential equations. Equations with separated
	variable. Homogeneous differential equation. First and second order
	linear differential equations. Discrete time- difference equations.
	(Lecture 12)
Week XIII	Function of more than one variable (Multivariable calculus). Partial
	derivatives. Partial and cross-partial elasticity. Total differentials.
	(Lecture 13)
	Make-up test (during 2E)- date: 20.12.2023
Week XIV	Extreme values (free and constrained optimum). Lagrange's
	function. Homogeneous function. Method of least squares.
	(Lecture 14)
	Quiz 4- date 27.12.2023.
Week XV	Preparation for the final exam.
Mandatory	Alpha C. Chiang Kevin Wainwright Fundamental Methods of
readings	Mathematical Economics, 4th edition, McGraw-Hill, 2005.
Semestral	Quizzes (4) 10 points
assessment	Test 40 points
	Final exam 50 points
List of lecturers	Vladimir Kašćelan, Full Professor
(academic)	
Name of the	Vladimir Kašćelan, Full Professor
course	
coordinator	
List of visiting	
lecturers	
(experts),(where	
applicable)	