NAME OF THE COURSE		Mathematics in Economics				
Code	EUA007	Year of study	1.			
Course teacher	Prof Zdravka Aljinović, Dr Branka Marasović, Associated professor, Dr Blanka Škrabić Perić, Associated Professor	Credits (ECTS)	5			
Associate teachers	Tea Kalinić, mag. Math.	Type of instruction (number of hours)	L	S	E	F
			26		26	
Status of the course	Obligatory	Percentage of application of e-learning	35			

COURSE DESCRIPTION

Course objectives	After having followed this course, students should have the ability to use additional mathematical tools necessary for further study in economics.
Course enrolment requirements and entry competences required for the course	Prerequisites defined by the Faculty Statute.
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Mathematically model and solve different situations and processes from the field of application of mathematics in business and economic problems. Particular outcomes: 1. To analyse and elaborate applications of functions of more variables in economic problems; 2. To analyse and elaborate applications of differential equations in economic problems; 3. To acquire the basic terms of matrix calculus and operations with matrices; 4. To apply matrix calculus and operations in solving systems of linear equations and in input-output analyses; 5. To elaborate in details applications of compound interest calculus in different mathematical-financial problems; 6. To model and analyse various types of loans.

Course content broken down in detail by weekly class schedule (syllabus)

Lectures		Exercises	
Topic	Hours	Topic	Hours
Introductory lectures. Function of two or more variables. Partial derivatives. Higher partial derivatives.	2	Function of two or more variables. Partial derivatives. Higher partial derivatives.	2
Extrema of functions of two variables. Optimisation including Lagrange Multiplier. Calculus of multivariable functions in economics.	2	Extrema of functions of two variables. Optimisation including Lagrange Multiplier. Calculus of multivariable functions in economics.	2
First-order differential equations - Economic applications	2	First-order differential equations - Economic applications	2
Matrices. Matrix operations.	2	Matrices. Matrix operations.	2
Determinants.	2	Determinants.	2
Inverse matrices. Rank.	2	Inverse matrices. Rank.	2

	Systems of linear equations. Solving system of linear equations with the inverse. Cramer's rule. Gaussian elimination.	3	Systems of linear equations. Solving system of linear equations with the inverse. Cramer's rule. Gaussian elimination.	3	
	Mathematics of finance. Compound interest. Future (terminal) value. Present (discounted) value.	2	Mathematics of finance. Compound interest. Future (terminal) value. Present (discounted) value.	2	
	Accumulated value of a stream of payments. Discounted value of a stream of payments. Continuous compounding.	2	Accumulated value of a stream of payments. Discounted value of a stream of payments. Continuous compounding.	2	
	Loan. Various models of loan amortization.	5	Loan. Various models of loan amortization.	5	
	Refinancing a loan.	2	Refinancing a loan.	2	

Format of instruction	☒ lectures ☐ seminars and workshops ☒ exercises ☐ *on line* in entirety ☒ partial e-learning ☐ field work	☐ ndependent assignments ☐ multimedia ☐ laboratory ☐ work with mentor ☐ (other)
Student responsibilities	Students are required to attend classes and actively participate in classes. Students' activity will be monitored through self-evaluation quizzes that will be available to students on the course websites within the Moodle platform. In case the student takes less than two self-evaluation quizzes during the semester and attends less than 50% of lectures and exercises, the student will be denied a signature. The condition for taking the exam is a signature.	

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance	1.5 ECTS	Research		Practical training	
	Experimental work		Report		Self-evaluation quizzes	0.5 ECTS
	Essay		Seminar essay		(Other)	
	Mid-term exams	3* ECTS	Oral exam		(Other)	
	Written exam	3* ECTS	Project		(Other)	

Grading and evaluating student work in class and at the final exam	1. Mid-term exams during classes. 2. Written exam. * During semester, there are two mid-term exams: - In the first one, the course outcomes regarding functions of more variables, differential equations and matrix calculus are checked. - In the second one, the course outcomes regarding financial mathematics are checked. The exam can be passed by passing both mid-term exams. Mid-term exam is considered to be passed if at least 50% of possible points are accomplished. Scoring and appropriate marks: 0-49 insufficient (1) 50-64 sufficient (2) 65-75 good (3) 76-85 very good (4)

	86-100 excellent (5)		
Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	1. Babić, Z., N. Tomić-Plazibat, Z. Aljinović, Matematika u ekonomiji, Ekonomski fakultet, Split, 2009.	10	
	2. Babić, Z., N. Tomić Plazibat, Z. Aljinović, Matematika, Ekonomski fakultet, Split, 2008.	10	
Optional literature (at the time of submission of study programme proposal)	Chiang, A.C., Osnovne metode matematičke ekonomije, MATE,d.o.o., Zagreb, 1994. Gardijan, M. et al., Zbirka zadataka iz matematike, Sveučilište u Zagrebu, Ekonomski fakultet, Zagreb, 2015. Perić, T., Matematika u ekonomskoj analizi, Alka script, Zagreb, 2016.		
Quality assurance methods that ensure the acquisition of exit competences	Registering students' attendance and success in carrying out of their duties (lecturer). Monitoring lectures and practice sessions (Vice Dean for Education). Students' Performance analysis in each course (Vice Dean for Education). Student questionnaire on the quality of lecturers and lessons for each course (University of Split, Quality Assurance Centre) Examination is used as an instrument to evaluate individual course outcomes by the course lecturer. The content of exam is reassessed periodically in order to assure compliance with the course outcomes.		
Other (as the proposer wishes to add)	The course is taught in Croatian.		