Faculty of Economics / ECONOMICS /

Course:				
Course ID	**Course status**	**Semester**	**ECTS credits**	**Lessons** (Lessons+Exercises+Laboratory)
11718	Mandatory	2	7	4+2+0
Programs	ECONOMICS			
Prerequisites	No conditionality.			
Aims	The goal is to enable students to understand the basic definitions and statements from Mathematical Economics, in order to freely use mathematical techniques in theoretical economics. It will also enable the development of skills in mathematical modeling.			
Learning outcomes	After completion of this course the student will be able to: 1. Use and explain basic principles, terminology, methods and techniques learned. 2. Apply described concepts and methods on economic phenomenon and create and solve a mathematical- economic models.			
Lecturer / Teaching assistant	prof. dr Vladimir Kašćelan, mr Nemanja Popović			
Methodology	A classical lecture and exercises. Discussion and clarification during lectures. Short oral test of understanding and knowledge of the subject matter of the lectures, with the active participation of students in solving problems. It is planned one test and final exam.			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	The nature of mathematical economics. Economic models. Static (equilibrium) analysis. Linear models and matrix algebra.			
I week exercises	The nature of mathematical economics. Economic models. Static (equilibrium) analysis. Linear models and matrix algebra.			
II week lectures	Application to Market and National-income models. Leontief Input-Output models.			
II week exercises	Application to Market and National-income models. Leontief Input-Output models.			
III week lectures	Comparative-static analysis. Rate of change and the derivative. Economic functions. Marginal function and its application in economics. Jacobian determinants. General-function models.			
III week exercises	Comparative-static analysis. Rate of change and the derivative. Economic functions. Marginal function and its application in economics. Jacobian determinants. General-function models.			
IV week lectures	Economic applications of integrals. First order linear differential equations.Dymatics of market price. Dynamic stability of equilibrium. Domar and Solow growth models. Inflation.			
IV week exercises	Economic applications of integrals. First order linear differential equations.Dymatics of market price. Dynamic stability of equilibrium. Domar and Solow growth models. Inflation.			
V week lectures	First order linear difference equations. Dynamic stability of equilibrium. Stability conditions. The cobweb model. Domar growth model. A market model with inventory.			
V week exercises	First order linear difference equations. Dynamic stability of equilibrium. Stability conditions. The cobweb model. Domar growth model. A market model with inventory.			
VI week lectures	Second order linear differential equations. A market model with price expectations. Inflation and unemployment.			
VI week exercises	Second order linear differential equations. A market model with price expectations. Inflation and unemployment.			
VII week lectures	Second order linear difference equations. Samuelson model. Inflation and unemployment. Test.			
VII week exercises	Second order linear difference equations. Samuelson model. Inflation and unemployment. Test.			
VIII week lectures	Systems of differential and difference equations. Eigenvectors and eigenvalues of a matrix. Transformation of a higher-order dynamic equation. Solving a system of differential equations using matrix, eigenvalues and eigenvectors. Inflation and unemployment.			
VIII week exercises	Systems of differential and difference equations. Eigenvectors and eigenvalues of a matrix. Transformation of a higher-order dynamic equation. Solving a system of differential equations using matrix, eigenvalues and eigenvectors. Inflation and unemployment.			
IX week lectures	Solving a system of difference equations using a matrix, eigenvalues and eigenvectors. Make-up test.			
IX week exercises	Solving a system of difference equations using a matrix, eigenvalues and eigenvectors. Make-up test.			

X week lectures	The phase diagram. The phase diagram in case of differencial and difference eguation. The phase diagram of nonlinear difference equation.
X week exercises	The phase diagram. The phase diagram in case of differencial and difference eguation. The phase diagram of nonlinear difference equation.
XI week lectures	Markov chains.
XI week exercises	Economic applications of Markov chains.
XII week lectures	Nonlinear programming. Kuhn-Tucker conditions. Concave programming.
XII week exercises	Nonlinear programming. Kuhn-Tucker conditions. Concave programming.
XIII week lectures	Game theory.
XIII week exercises	Economic applications of Game theory.
XIV week lectures	Function of more than one variable. Economic applications.
XIV week exercises	Function of more than one variable. Economic applications.
XV week lectures	Homogeneous function.Economic applications. Extreme values (free and constrained optimum). Price discrimination. Utility maximization and consumer demand.
XV week exercises	Homogeneous function.Economic applications. Extreme values (free and constrained optimum). Price discrimination. Utility maximization and consumer demand.
Student workload	4+2

Per week	**Per semester**
7 credits x 40/30=9 hours and 20 minuts 4 sat(a) theoretical classes 0 sat(a) practical classes 2 excercises **3 hour(s) i 20 minuts** of independent work, including consultations	Classes and final exam: **9 hour(s) i 20 minuts x 16 =149 hour(s) i 20 minuts** Necessary preparation before the beginning of the semester (administration, registration, certification): **9 hour(s) i 20 minuts x 2 =18 hour(s) i 40 minuts** Total workload for the subject: **7 x 30=210 hour(s)** Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) **42 hour(s) i 0 minuts** Workload structure: **149 hour(s) i 20 minuts (cources), 18 hour(s) i 40 minuts (preparation), 42 hour(s) i 0 minuts (additional work)**
Student obligations	Students are required to attend classes.
Consultations	In official times.
Literature	1. Alpha C. Chiang. Fundamental Methods of Mathematical Economics, Second edition, McGraw-Hill, 1974. 2. A.C. Chiang, K.Wainwright. Fundamental methods of Mathematical Economics, 4th edition, McGraw Hill 2005. 3. B. Šego, T. Škrinjarić, V. Kojić. Odabrana poglavlja matematičke ekonomije. Ekonomski fakultet Zagreb, 2014.
Examination methods	Test - 35 points; Final exam - 35 points; Seminar paper - 15 points; Quizzes- 15 points. A passing grade is obtained if at least 50 points are cumulatively collected.
Special remarks	
Comment	

Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points