Module description (syllabus): Ekonomia matematyczna

Module title:	**Ekonomia matematyczna**	**ECTS**	**4**
Module title translation:	Mathematical economics		
Module for study direction:	**Ekonomia**		

Module language: **angielski**		Study level: **2**	
Study cycle: **stacjonarne**	Module status: **kierunkowy - obowiązkowy**	Semester number: **2** **semestr letni**	
Academic Year from which module description is valid :		**2020/2021**	Catalogue number: **EKR-E-2S-2-08-KO-2020-EN**

Person in charge of the module:	**Łukasz Pietrych, dr**		
Teachers responsible for classes:	**Łukasz Pietrych, pracownicy Katedry ERiMSG**		
Unit responsible for the module:	**Katedra Ekonometrii i Statystyki**		
Faculty in charge:	**Wydział Ekonomiczny**		
Objectives of the module:	a. study of methods of proofs and strict reviewing of some sections of mathematics b. to provide you with the mathematical tools needed to understand your other Örst year courses c. the course is designed to provide students with the fundamental tools of convex optimization and the principal mathematical techniques used in economic theory and modeling d. the objective of the course is to analyze of the economic data files, calculations and presentations of the data **Lectures** • Some mathematical preliminaries concepts; • Economic applications of straight line, mathematical modeling; • Demand, supply, cost, revenue; • Elasticity of demand, supply and income; • Some nonlinear functions and applications; • Financial data and calculations; • Continuous and differentiable functions of one variable. Application of differentiation; • Integration and applications: consumer and producer surplus; • Differential equations; • Linear algebra and applications; • Linear programming. **Classes** Exponential and Logarithmic Functions. Differentials and Derivatives. Optimization with Equality Constraints. Further Topics in Optimization. Continuous and differentiable functions of one variable. Integral Calculus. First-order ordinary diferential equations Matrix Algebra. Systems of equations and matrices. Gaussian elimination, matrix operations.		
Teaching forms and number of hours:	a. lectures - no of hours: full time study: 15, part-time study. 0 b. laboratory classes - no of hours: full time study: 15, niestacj. 0		
Teaching methods:	discussion, problem solving, consultation with the lecturer, case study		
Initial requirements and formal prerequisities:	Mathematics and informatics as obligatory curse		
Learning outcomes:	**Knowledge - knows and understands:** 1. Students understand and prove the basic methods of linear algebra and calculus, and also to investigate the economic problems of comparative statics and optimization within the framework of a basic tools of mathematical models	**Skills - can:** 2. The student should have skills of application of the indicated mathematical tools and methods to solution of problems in Micro- and Macroeconomics	**Competences - is ready for:** 3. Be able to present solutions to problems in the above mentioned areas in a logical and clear manner
Assessement methods:	test on classes (efekty: 1, 2), writing exam (efekty: 1, 2, 3)		
Formal documentation of the learning outcome:			
Elements of the final grade and their weights:	test during classes - 50%, writing exam - 50%		
Place of teaching:			

Teaching materials (obligatory and additional):

1. A. Chiang: "Fundamental Methods of Mathematical Economics", McGraw-Hill UK;1980.
2. T. Bradley: "Essential Mathematics for Economics and Business", John Willey and Sons, 2008.
3. Hal R. Varian: "Intermediate Microeconomics: A Modern Approach Textbook in microeconomics". W.W. Norton and Company 1987. Fifth English edition 1999.
4. F.S. Hiller, G.J. Lieberman: "Introduction to operations research". 7th Edition, McGraw-Hill Series in Industrial Engineering and Management Science, 2001.
5. Carl P. Simon, L. Blume: "Mathematics for Economists", W. W. Norton and Compony, 1994.

Remarks:
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Quantitative indicators describing the module:	
Estimated total number of student work hours (contact and own work) necessary to achieve the learning outcomes assumed for the module - on this basis, complete the ECTS field:	**94/0**
The total number of ECTS points which the student receives in module requiring direct participation of academic teachers or other persons:	**1.36/0 ECTS**

Table of compliance of the directional learning outcomes with the effects of the module

Outcome category	Learning outcomes for module:	Reference to effects for the study program for the direction of study	The impact of classes on the directional effect*)
Knowledge	1. Students understand and prove the basic methods of linear algebra and calculus, and also to investigate the economic problems of comparative statics and optimization within the framework of a basic tools of mathematical models	EK2_KW03	2
Skills	2. The student should have skills of application of the indicated mathematical tools and methods to solution of problems in Micro- and Macroeconomics	EK2_KU02	2
Competences	3. Be able to present solutions to problems in the above mentioned areas in a logical and clear manner	EK2_KK01	2

*) 3 - advanced and detailed, 2 - significant, 1 - basic