Subject code	ECTS credits
MAT3019	6

Course title in Lithuanian

DUOMENŲ ANALIZĖS METODAI

Course title in English

DATA ANALYSIS METHODS

Short course annotation in Lithuanian (up to 500 characters)

Šio kurso tikslas yra suteikti studentams koreliacinės ir regresinės analizių teorinių ir praktinių žinių. Kursas suteiks pagrindines žinias apie koreliacinę analizę, skaičiuojamus koreliacijos koeficientus, ranginę koreliaciją, koreliacijos reikšmingumo tikrinimą, regresinės analizės pagrindines sąvokas, mažiausiųjų kvadratų metodą, netiesinę regresiją ir koreliaciją, daugialypę regresiją, tiesinės regresijos prielaidų pažeidimus, fiktyvius kintamuosius.

Short course annotation in English (up to 500 characters)

The main objectives of the course are to present basics of correlation and regression analysis. Teaching methods are lectures and practical works. The main topics cover: correlation of quantitative and qualitative variables, testing correlation statistical significance, building regression models, testing models and parameters significance, solving models identification problems.

Prerequisites for entering the course

Probability Theory, Mathematical Statistics, Algebra.

Course aim

Course aim is to provide understanding of correlation and regression analysis.

Links between course outcomes, criteria of learning achievement evaluation, study methods and methods of learning achievement assessment

No	Course outcomes	Criteria of learning achievement evaluation	Study methods	Methods of learning achievement assessment
1	Estimate correlations of quantitative and qualitative variables and test statistical significance	Student demonstrates the ability to recognize and describe the concepts of correlation analysis, to calculate various correlations, test their statistical significance	Lectures, practical works, individual work, consulting	Mid-term exam, Assessment of practical works
2	Build simple and multiply regression models	Student demonstrates the ability to perform initial statistical analysis and build simple regression models	Lectures, practical works, individual work, consulting	Mid-term exam, Assessment of practical works
3	Estimate regression models parameters and test their statistical significance	Student demonstrates the ability to estimate regression models and models parameters and test statistical significance	Lectures, practical works, individual work, consulting	Final exam, assessment of practical works
4	Solve models identification problems	Student demonstrates the ability to identify problems of regression models and find problems solution methods	Lectures, practical works, individual work, consulting	Final exam, assessment of practical works

Links between study programme outcomes and course outcomes

Study programme outcomes	Running number of course outcome			
	1	2	3	4
Comprehend and be able to apply probabilistic and statistical methods for data analysis	+	+	+	+

Identify the problem, collect and analyze real/theoretical data using various mathematical methods, tools and IT technologies	+	+	+	+
Having good foundations of mathematics, logically and critically recognize and describe relations between quantities of real life and mathematical concepts	+	+		
Think logically and analytically, evaluate alternative ways of task solving and implement optimal solutions				
Work individually and/or in groups by developing and adopting appropriate mathematical models and tools for use in case analysis		+	+	+
Demonstrate awareness of economic, legal, social, ethical and environmental context in mathematical projects		+	+	

Content

No	Content (topics)
1.	Basics of correlation analysis.
2.	Rank correlation.
3.	Classical regression definition.
4.	Linear regression model and least square method.
5.	Nonlinear regression and correlation.
6.	Maximum likelihood method.
7.	Multiply regression.
8.	Errors assumptions.
9.	Dummy variables.
10.	Multicollinearity, heteroscedasticity, autocorrelation.

Distribution of workload for students (contact and independent work hours)

Lectures	45 hours
Practical work	30 hours
Individual students work	85 hours
Total:	160 hours

Structure of cumulative score and value of its constituent parts

Final written exam (50%), mid-term written exam (25%), assessment of practical work (25%).

Recommended reference materials

No	Publication year	Authors of publication and title	Publishing house	Number of copies in		
				University library	*Self study rooms*	*Other libraries*
Basic materials						
1.	2007	R.Krikštolaitis. Priklausomybės tyrimas. (Correlation Analysis)	Kaunas, VDU	7	2	5
2.	2016	R.Krikštolaitis. Ekonometrika (Ekonometrics)	Kaunas, VDU			Free access in VMU Moodle system for students of this study subject
3.	2002	V.Čekanavičius, G. Murauskas. Statistika ir jos taikymai. II dalis (Statistics and its Applications)	Vilnius, TEV	20	1	20
Supplementary materials						
1.	2001	G.S. Madala. Introduction to Econometrics. 3rd ed.				

2.	2016	Dougherty. Introduction to Econometrics	Oxford University Press. Online Resource Centres	Free online access http://global.oup.com/uk/orc/busecon/economics/dougherty5e/
3.	1998	С.А.Айвазян, В.С.Мхитарян. Прикладная статистика и основы эконометрики. (Applied Statistics and Basics of Econometrics)	Москва, Юнити	

Course programme designed by

Prof.dr. Ričardas Krikštolaitis