

COURSE UNIT DESCRIPTION

Course unit title	Code
STATISTICS	

Lecturer(s)	Department, Faculty
Coordinating: dr. Jurgita Dabulytė-Bagdonavičienė Other:	Kaunas Faculty Institute of Social Sciences and Applied Informatics

Study cycle	Type of the course unit
Bachelor	Compulsory / Individual Studies

Mode of delivery	Semester or period when it is delivered	Language of instruction
Face to Face	Spring semester	LT, EN

Requisites	
Prerequisites: Advanced Mathematics, Discrete Mathematics in Computer Science	Co-requisites (if relevant):

Number of ECTS credits allocated	Student's workload (total)	Contact hours	Individual work
5	130	52	78

Purpose of the course unit: programme competences to be developed		
To acquaint students with the basics of mathematical statistics, the basic principles of compiling a mathematical model of a statistical experiment, and to teach them to independently apply in practice the methods of data systematization and statistical analysis to the mathematical models of real phenomena under study. Students will learn to analyse and interpret the results of statistical calculations obtained using the R programmatic language.		
Learning outcomes of the course unit	Teaching and learning methods	Assessment methods
Students will get acquainted with the basic concepts of statistics: population, methods of compiling a representative sample, indicators of descriptive statistics, methods of graphical representation, testing of hypotheses, correlation and regression analysis, and the theory and practice of time series analysis.	Lectures, Case analysis, Studies of literature, Search for information and data	Exam (specific data statistical analysis), Theoretical assessment (with open and closed type questions)
Students will be able to statistically analyse real data, work with the RStudio program in calculating the numerical characteristics of the data, visualizing the data with various charts or graphs.	Lectures, Practice work with the RStudio program, Individual tasks, Analysis of situations,	Exam (specific data statistical analysis), Theoretical assessment (with open and closed type questions),

Students will be able not only to put forward hypotheses, test them, but will be able to substantiate the results, analyse conclusions, predict future prospects. Students will acquire practical skills for working with time series, will be able to distinguish their main components, select the most effective forecasting methods and interpret the results obtained while ensuring statistical reliability.	Discussions, Presentation of teamwork report.	Evaluation of team work and its presentation (according to the chosen topic) Evaluation of individual works
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Course content: breakdown of the topics	Contact hours							Individual work: time and assignments
	Lectures	Tutorials	Workshops	Laboratory work	Consultations	Contact hours, total	Individual work	Assignments
<i>Descriptive statistics</i> Research, surveys, experiments. Population and sample. Graphical representation of data. Tables of frequencies, relative frequencies. Numerical characteristics of the data: position, variation, form. The most important probabilistic distributions. Point and interval estimates of parameters.	4		10			12	21	Performance of practical tasks, Preparation of practical works with RStudio.
<i>Hypotheses</i> Parametric and nonparametric statistical hypotheses. Criteria for checking hypotheses. Dispersion analysis.	4		8			14	19	Performance of practical tasks, Preparation of practical works with RStudio.

<i>Correlational and regression analysis</i> Simple linear regression and correlation. Coefficients of determinacy and correlation. Group linear and curvilinear regression. The significance of the regression analysis.	4		6			8	19	Performance of practical tasks, Preparation of practical works with RStudio.
<i>Forecasting time series</i> Time series components. Trend. Seasonal fluctuations. Methods of forecasting time series: exponential, ARIMA, autoregressive.	4		8			14	19	Performance of practical tasks, Preparation of practical works with RStudio.
Exam					4	4		
Total	16		32		4	52	78	

Assessment strategy	Weight %	Deadline	Assessment criteria
One theoretical/practical settlement	20 %	On agreed time	The settlement consists of up to 10 different theoretical / practical questions. The rating is proportional to the number of correct answers.
Three practical works performed during the semester (can be performed in a group of 2 students each)	30 %	On agreed time	Practical works are divided into three parts according to theoretical topics - descriptive statistics, testing of hypotheses, correlation and regression analysis. Students must solve the submitted tasks with RStudio and describe the results obtained in the report. Assessed in terms of work quality and knowledge demonstrated by the student. The use of AI tools in the performance of practical tasks is prohibited.
Exam	50 %	During the session	The exam consists of a theoretical and practical part. The theoretical part contains questions from the topics outlined during the lectures. The practical part takes place using RStudio. The student must demonstrate his skills in solving a specific task of statistical analysis. The use of AI tools during the exam is prohibited.

			<p>Evaluated on a scale of 1-10 grades: 10-9: Excellent knowledge and skills. Assessment level. 90-100% correct answers. 8-7: Good knowledge and skills may be insignificant errors. Level of synthesis. 70-89% correct answers. 6-5: Average knowledge and skills, there are mistakes. Level of analysis. 50-69% correct answers. 4-3: Knowledge and skills are below average, there are (substantial) errors. Level of knowledge application. 20-49% correct answers. 2-1: Minimum requirements not met. 0-19% correct answers.</p>
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Author	Publishing year	Title	Issue of a periodical or volume of a publication; pages	Publishing house or internet site
Required reading				
1. Čekanavičius V., Murauskas G., Statistika ir jos taikymai. D.1-Vilnius: TEV, 2015.- 239p., ISBN 9789986546931				
2. Čekanavičius V., Murauskas G., Statistika ir jos taikymai. D.2-Vilnius: TEV, 2004.- 272p. ISBN 9955-491-16-7.				
3. Bagdonavičius V., Kruopis J., Levulienė R., Matematinės statistikos uždavinynas su sprendimais. - Vilnius: VU leidykla, 2019.-288p.				
4. Illowsky B., College D.A., Dean S., Introductory Statistics, ©2018 Rice University, 913 pp., ISBN-13: 978-1-938168-20-8, https://openstax.org/details/books/introductory-statistics?Book%20details				
5. Çetinkaya-Rundel M., Hardin J., Introduction to Modern Statistics, © 2021 OpenIntro, 549pp. https://openintro.org/book/ims/				
6. Shumway R. H., Stoffer D.S., Time Series Analysis and Its Applications: With R Examples, © 2016 Springer, 568pp., http://www.stat.ucla.edu/~frederic/415/S23/tsa4.pdf				
Recommended reading				
1. James T. McClave, Terry T Sincich. A First Course in Statistics plus MyStatLab with Pearson eText, Global Edition, 12/E, 2020.				
2. Robert A. Donnelly, Business Statistics, 2nd Edition, ©2015, Pearson, Cloth, 984 pp, ISBN-13: 9780321925121				
3. Aksomaitis A., Tikimybių teorija ir statistika. -Kaunas: Technologija, 2002. -348 p.				
4. Sakalauskas V. Statistika su STATISTICA.Vilnius: "Margi raštai", 2003, 240p.				
5. Bagdonavičius V., Kruopis J., Matematinė statistika. I dalis -Vilnius: VU leidykla, 2007.-411p.				