COURSE UNIT (MODULE) DESCRIPTION

Course unit (module) title	Code
Statistics	

Lecturer(s)	Department(s) where the course unit (module) is delivered
Coordinator: prof.dr.G. Kasnauskiene **Other(s):**	Faculty of Economics and Business Administration, Department of Quantitative Methods and Modelling, Sauletekio av. 9, Vilnius

Study cycle	Type of the course unit (module)
First	compulsory

Mode of delivery	Period when the course unit (module) is delivered	Language(s) of instruction
Face-to-face	2nd semester	English

Requirements for students	
Prerequisites: Economics, Mathematics	**Additional requirements (if any):**

Course (module) volume in credits	Total student's workload	Contact hours	Self-study hours
5	130	64	66

Purpose of the course unit (module): programme competences to be developed		
Purpose of the course – to provide students with relevant knowledge and skills necessary for modern statistical business analysis. Emphasis is placed on applications; all topics are illustrated by the examples from Lithuanian and global business and economics reality. This subject aims to develop the ability to raise and address intercultural behaviour issues arising in global marketing and business environment, the ability to analyze and use information related to cultural differences in business and marketing and the ability to communicate and collaborate in multicultural teams.		
Learning outcomes of the course unit (module)	**Teaching and learning methods**	**Assessment methods**
On completion of the course students will be able to: Know and understand the importance of modern statistical analysis for organizational development Collect, analyze and systematize data necessary for the organization, its environment and processes, and for making meaningful conclusions for business decisions. Independently find statistical information and analyse it Independently conduct empirical research and summarize the results. Carry out statistical calculations in MS Excel and IBM SPSS. Know the principles of teamwork and will be able to apply them in solving tasks in an international team.	*Teaching methods:* traditional or interactive lecture, discussion, problem-based learning, collaborative learning, individual and group (team) project, written paper. Presentation of material during the lectures by linking with practical examples of statistical analysis. Lectures delivered by the social partners: Lithuanian Department of Statistics (State Data Agency) etc. *Learning methods:* readings, calculations (manual and using MS Excel or/and IBM SPSS),	Evaluation form: written examination (mid-term test - the closed type questions that require revealing the progress and results, and final test (formulae and statistical tables are allowable). Quality of Team project: problem-solving task (written report), oral illustrated report.

	searching for information, preparation and presentation of the team project.	

Themes	Contact hours							Independent work assignments	
	Lectures	Consultations	Seminars	Practical classes	Lab works	Practice	**Total contact hours**	**Independent work**	**Assignments**
Introduction. STATISTICS, DATA, AND STATISTICAL THINKING? *Why a manager needs to know about statistics? Key definitions. Types of Data.*	2			1	1		4	4	Individual study of summaries of lecture and supplementary material, reading of corresponding chapter of Business Statistics textbooks. Statistical calculations in Excel and IBM SPSS.
DATA COLLECTION. *Data sources. Research steps. Designing of* a *survey questionnaire*.	2			1	1		4	3	Individual study of summaries of lectures and supplementary material, reading of corresponding chapter of Business Statistics textbooks. Designing the individual questionnaire.
PRESENTING DATA IN TABLES AND CHARTS. *The Ordered Array and Stem-Leaf Display. Frequency Distributions. Tabulating and Graphing Univariate and Bivariate Data.*	2			1	3		6	3	Independent study of the summary of lectures and supplementary material, reading of corresponding chapter of Business Statistics textbooks. Discussion of the questionnaires designed and the solution of exercises.
NUMERICAL DESCRIPTIVE MEASURES. *Measures of central tendency, variation, and shape. The empirical rule. Five number summary and box-and-whisker plots.*	4			2	3		9	4	Independent study of the summary of lectures and supplementary material, reading of corresponding chapter of Business

									Statistics textbooks. Discussion of the solution of exercises.
PROBABILITY. *Basic Concepts of Probability. Rules of Probability*	2			1			3	3	Independent study of the summary of lectures and supplementary material, reading of corresponding chapter of Business Statistics textbook.
Preparation for the mid-term test								8	Independent study of the summary of lectures and supplementary material, reading of chapters 1-5 of Business Statistics textbook.
PROBABILITY DISTRIBUTIONS. *Discrete and continuos Distributions. Random Variables. Binomial Distribution. Poisson Distribution. The Standard Normal Distribution.*	2			1			3	3	Independent study of the summary of lectures and supplementary material, discussion of the solution of exercises.
SAMPLING DISTRIBUTIONS. *The distribution of a sample's mean using the central limit theorem, correcting for a finite population if necessary.The distribution of a sample's proportion.*	2			1			3	3	Independent study of the summary of lectures and supplementary material, discussion of the solution of exercises.
ESTIMATES AND SAMPLE SIZES. *Estimates and Sample Sizes of Means. Estimates and Sample Sizes of Proportions.*	2			1	2		5	3	Independent study of the summary of lectures and supplementary material, discussion of the solution of exercises.
TESTING HYPOTHESIS. *Null and Alternative Hypotheses. Type I and Type II Errors. Testing a Claim about a Mean. Testing a Claim about a Proportion.* ***Inferences from Two Samples***. *Inferences about Two Means. Inferences about Two Proportions.*	4			2	2		8	3	Independent study of the summary of lectures and supplementary material, reading of corresponding chapter of Business Statistics textbooks. Discussion of the team project and solution of exercises

1. ***LINEAR REGRESSION AND CORRELATION.*** *Calculation and interpretation of the simple correlation between two variables. Regression analysis and its applications for purposes of prediction and description.* ***Multiple Regression****. The Multiple Regression Equation. Making Predictions*	4			2	2		8	3	Discussing the progress of the project and solution of exercises
2. ***ANALYZING AND FORECASTING TIME-SERIES DATA.*** *The components present in a time series. Smoothing-based forecasting models, including single and double exponential smoothing. Trend-based forecasting models*	4			1	2		7	3	Discussing solution of exercises.
Project				1			1	10	Team work (see project description)
4. ***INDEX NUMBERS.*** *Construction and interpretation of indexes. The Consumer Price Index.*	2			1			3	4	Assessment of knowledge and activeness demonstrated by students. Solution of exercises. Pre-exam test
5. ***Preparation for the final exam***								7	Independent study of the summaries of lectures and supplementary material
Total:	**32**			**16**	16		**64**	66	

Assessment strategy	**Share in %**	**Time of assessment**	**Criteria of assessment**
In class activity and home work	10	During semester	It is expected that student actively participates in discussions, responds to the questions, formulates problems and questions, provides critical comments and presents properly accomplished home assignments during *all* seminars. The submission of solutions is to be conducted within the VL environment. In the event that a minimum of three HWs are not submitted, no score is awarded. The evaluation of solutions is not conducted; rather, a random selection of works is reviewed. In the event that the submitted HWs do not include the specified tasks, they are not included in the count.
Mid-term test	20	Middle of the semester	Quality of answers to the closed type questions of the course conducted within the VL environment in the vu room only specified in the schedule. Topics 1-5. 40 closed type questions in the test. Once the question is answered, there is no possibility to return to it. Students are not allowed to use their notes, textbooks, other printed and electronic materials. There is no possibility to make up the test assessment.
Team project	40	During the semester	Written report on a project (following its detailed description on data analysis, interpretation, conclusion

			and recommendations) and its presentation in MS PPT. The report should explicitly communicate the level of effort in an area. The evaluation areas are: - factual analysis of the problem based on the tasks specified in the project description (did the student achieve the project goals? did the student gain knowledge regarding research methods?). - creativity, suitability and originality of proposed solutions; - ability to work by applying statistical methods in business using MS Excel and IBM SPSS; - ability to write a report and present the project effectively (requirements for academic written works are met, all required work sections are present, work possesses appropriate structure and content, work is written in academic language); - ability to answer the project-related questions. The mark is obtained by combining the assessment of a number of these factors: 9.0 – 10: A truly outstanding project. The project outcomes (system, theory, empirical evaluation) should be essentially faultless, well-structured and carefully tested, proved or rigorously evaluated. There should be full achievement of objectives and evidence of original thought. The project objectives must be very demanding and there should be a wide range of cogently-justified project extensions. The report should be superbly organised and presented and lucidly written. The quality of the research and report should be equally high. The work should be of publishable quality. 8.0 – 8.9: An outstanding project. The project outcomes (system, theory, empirical evaluation) should be essentially faultless, well-structured and carefully tested, proved or rigorously evaluated. There should be full achievement of demanding objectives and evidence of original thought. The report should be well organised and presented and clearly written. 7.0 – 7.9: Students will show an understanding of all aspects of the project material, producing work without significant error or omission. Project objectives should be reasonably demanding and fully achieved. The report should display excellent organisational and presentational skills, and contain a thorough evaluation and objective critical reflection. 6.0 – 6.9: The project should be competent in all respects. The project's primary objectives are somewhat demanding and should be substantially achieved to a reasonable standard. Students will show an understanding of the technical and professional issues involved. The presentation and organisation of the report should be clear. 5.0 – 5.9: The project should be competent in most respects. The project objectives may not be very demanding but should be achieved to a reasonable standard. The presentation and organisation of the report should be reasonably clear. There may be some signs of weakness, but overall the grasp of the topic should be sound. 4.0 – 4.9: The project will indicate a basic understanding of the methods to be used and how to organise and present

			the work in the report, but will not have gone beyond this, and there may well be signs of confusion about more complex material. There should be fair work towards the project objectives and the final report must clearly represent a development of the interim report. 3.0 – 3.9: There should be work towards the project objectives, but significant issues are likely to be neglected. There may be significant errors or misconceptions in the project. The final report may represent little progress with respect to the interim report. 1.5 – 2.9: The project may contain some correct and relevant material, but most issues are neglected or are covered incorrectly. There should be some signs of appreciation of the project requirements. 0 – 1.4: Very little or nothing that is correct and relevant and there is no real appreciation of the project requirements. *Notes:* The project must be submitted on time. Extensions will not be granted, except in the case of personal emergency. The end-of-semester exam can be taken only after presenting the project and receiving its positive assessment. Differentiated evaluation of team members is possible.
Final test	30	26, May	Quality of answers to the closed-type questions of the course (open book exam) in Moddle in the vu room specified in the schedule. This test covers topics from 6 to the last one covered in this course. The final grade is determined based on the given weighting and marks. Grades will be assigned as follows: **10** points: excellent knowledge and skills; **9** points: very good knowledge and skills; **8** points: good knowledge and skills; **7** points: fair knowledge and skills; **6** points: satisfactory knowledge and skills; **5** points: poor knowledge and skills. **4** to **0** points: unsatisfactory knowledge and skills. *Notes:* The final (cumulative) grade is rounded off to whole grade arithmetically (e.g. from 6.5 to 7.4 = 7; from 7.5 to 8.4 = 8 etc.) 4.9 or lower is a failing grade, a 5 or higher is a passing grade. Attendance of the lectures and seminars is mandatory. If the student misses three and more seminars and/or does not present the project, he/she does not have the right to take the end-of-semester final test.
Equivalency examination			Individually prepared project – 40% (to be presented and defended at least one week before exam); final test - 60%.

Author	Year of publication	Title	Issue of a periodical or Volume of a publication	Publishing place and house, or web link
Compulsory reading				
Kasnauskiene G.	2022	Manual of Business Statistics		VU https://rise.articulate.com/share/EiiJGK0zPD7sQbCKfwb1f34OhXj4alpC
Argyrous G.	2011	Statistics for research with a guide to SPSS	3rd ed.	Sage
IBM	2025	IBM SPSS Statistics 31 Brief Guide		https://www.ibm.com/docs/en/SSLVMB_31.0.0/pdf/IBM_SPSS_Statistics_Brief_Guide.pdf
Optional reading				
Flyn D.	n.d.	Student Guide to SPSS		https://faculty.ksu.edu.sa/sites/default/files/student_user_guide_for_spss.pdf
McClave J.T., Benson P.G., Sincich T.	2008	Statistics for Business and Economics	10th ed.	Prentice-Hall, Inc.
Holmes, L., Illowsky, B., Dean, S.	2017	Introductory Business Statistics		https://open.umn.edu/opentextbooks/textbooks/509