

Subject card

Subject name and code	Mathematical Statistics, PG_00156995						
Field of study	Finance and Accounting						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2025/2026		
Education level	undergraduate studies		Subject group		Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		English		
Semester of study	3		ECTS credits		5.0		
Learning profile	academic		Assessment form				
Conducting unit	Katedra Statystyki -> Faculty of Management						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Anna Gierusz-Matkowska				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	30.0	0.0	0.0	0.0	45
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	45		19.0		61.0	125
Subject objectives	Learn basic methods of statistical inference. Learn how to estimate population parameters, how to calculate and interpret confidence intervals, perform hypothesis testing.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[FiRL3_W06] The student has advanced knowledge of methods and tools, including data acquisition and analysis techniques, appropriate to management science and quality, which allow describing economic structures and institutions and the processes within and between them.	Knows advanced methods and tools, including data acquisition and analysis techniques, appropriate for statistical inference	[SW4] test/exam - oral or written
	[FiRL3_U07] The student analyses the proposed solutions to problems in the disciplines of management and quality sciences and economics and finance, especially in the field of finance and accounting, and is able to present their advantages and disadvantages and propose appropriate solutions in this regard.	Analyses proposed solutions to problems in the field of statistical inference; is able to present their advantages and disadvantages and propose appropriate solutions in this regard.	[SU1] oral statement/conversation/discussion [SU4] test/exam - oral or written
	[FiRL3_K01] Self-development: - understands the need for development and lifelong learning - is able to supplement and improve the acquired knowledge and skills - knows his strengths and weaknesses, sets ambitious goals to the best of his ability - knows how to accept failure and admit mistakes.	Self-improvement: - is able to supplement and improve acquired knowledge and skills in the field of statistical inference - is able to accept defeat and admit a mistake.	[SK8] observation of student's independent or team work
	[FiRL3_K05] Responsibility: - meets deadlines - is able to properly identify priorities for the implementation of the task set by him - consistently strives to achieve the set goal - is able to work systematically and independently - observes the rules and norms of social coexistence.	Responsibility: - is able to properly determine priorities for the implementation of statistical inference tasks - is able to work systematically and independently to solve statistical inference tasks	[SK1] oral statement/conversation/discussion [SK4] test/exam - oral or written
Subject contents	• define simple random sampling and a sampling distribution; • explain sampling error; • distinguish between simple random and stratified random sampling; • distinguish between time- series and cross- sectional data; • explain the central limit theorem and its importance; • calculate and interpret the standard error of the sample mean; • identify and describe desirable properties of an estimator; • distinguish between a point estimate and a confidence interval estimate of a population parameter; • describe properties of Students t-distribution and calculate and interpret its degrees of freedom; • calculate and interpret a confidence interval for a population mean, given a nor-mal distribution with 1) a known population variance, 2) an unknown popula-tion variance, or 3) an unknown variance and a large sample size; • describe the issues regarding selection of the appropriate sample size, data--mining bias, sample selection bias, survivorship bias, look- ahead bias, and time- period bias. • define a hypothesis, describe the steps of hypothesis testing, and describe and interpret the choice of the null and alternative hypotheses; • distinguish between one- tailed and two- tailed tests of hypotheses; • explain a test statistic, Type I and Type II errors, a significance level, and how significance levels are used in hypothesis testing; • explain a decision rule, the power of a test, and the relation between confidence intervals and hypothesis tests; • distinguish between a statistical result and an economically meaningful result; • explain and interpret the p-value as it relates to hypothesis testing; • identify the appropriate test statistic and interpret the results for a hypothesis test concerning the population mean of both large and small samples when the population is normally or approximately distributed and the variance is 1) known or 2) unknown; • identify the appropriate test statistic and interpret the results for a hypothesis test concerning the equality of the population means of two at least approxi-mately normally distributed populations, based on independent random sam-ples with 1) equal or 2) unequal assumed variances; • identify the appropriate test statistic and interpret the results for a hypothesis test concerning the mean difference of two normally distributed populations; • identify the appropriate test statistic and interpret the results for a hypothesis test concerning 1) the variance of a normally distributed population, and 2) the equality of the variances of two normally distributed populations based on two independent random samples; • distinguish between parametric and nonparametric tests and describe situations in which the use of nonparametric tests may be appropriate.		

Prerequisites and co-requisites	Knowledge of concepts from subjects:		
	Descriptive statistics		
	Probability concepts		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	End term written test	51.0%	50.0%
	Mid term written test	51.0%	50.0%
Recommended reading	Basic literature	1. Richard A. DeFusco, Dennis W. McLeavey, Jerald E. Pinto, David E. Runkle, Mark J. P. Anson, Quantitative Investment Analysis, 3rd Edition,Wiley and Sons 2016 2. Ken Black, Applied Business Statistics: Making Better business Decision, John Wiley and Sons 2011 3. Richard A. Johnson, Gouri K. Bhattacharyya, Statistics: Principles and Methods, John Wiley and Sons, 2011 4. David Ray Anderson, Dennis J. Sweeney, Thomas Arthur Williams, Thomas A. Williams, Statistics for business and economics, Cengage Learning, 2010 5. A. Aczel, J. Sounderparndian Complete Business Statistics with Student CD, The McGraw-Hill/Irwin Series 2009 6. E. Matanda, M. Mawere, Research methods and statistics for cross-cutting research: handbook for multidisciplinary research, Madrid: Langaa RPCIG 2022	
	Supplementary literature	1. W. Mendenhall, D.D. Wackerly, Mathematical Statistics with Applications, Thomson Learning (7th edition), 2007; 2. J.E. Freund, R.E. Walpole, Mathematical Statistics, Prentice-Hall, (4th edition), 1987.	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

Document generated electronically. Does not require a seal or signature.