

STATISTICAL DATA ANALYSIS

Course code	<i>FUN107</i>
Compulsory in the programmes	<i>All study programmes</i>
Level of studies	<i>Undergraduate</i>
Number of credits	<i>6 ECTS (48 in-class hours + 6 consultation hours + 2 exam hours, 104 individual work hours)</i>
Course coordinator (title and name)	<i>Assoc. prof. Vincentas Vobolevičius</i>
Prerequisites	<i>None</i>
Language of instruction	<i>English</i>

THE AIM OF THE COURSE:

The goal of the course is to provide students with the theoretical knowledge and practical skills necessary for the analysis of economic and political data. At the end of the course the students should be able to identify and apply the key methods of data analysis, carry out the analysis using specialized software, and to interpret the results.

MAPPING OF COURSE LEVEL LEARNING OUTCOMES (OBJECTIVES) WITH DEGREE LEVEL LEARNING OBJECTIVES (See Annex), ASSESMENT AND TEACHING METHODS

Course level learning outcomes (objectives)	Learning objectives for BSc in Business Management	Learning objectives for BSc in Social Science	Assessment methods	Teaching methods
CLO1. To understand the basic terminology used in statistics	BLO 1.2. BLO 3.1. BLO 3.2 BLO 4.1.	ELO 2.1. ELO 3.1. ELO 3.2. ELO 4.1.	Midterm & Final exam	Lecture and self-study
CLO2. To understand the basic principles of descriptive statistics	BLO 1.2. BLO 3.1. BLO 3.2 BLO 4.1.	ELO 2.1. ELO 3.1. ELO 3.2. ELO 4.1.	Midterm & Assignment 1	Lecture, lab, and self-study
CLO3. To understand the basic concepts of probability	BLO 1.2. BLO 3.1. BLO 3.2 BLO 4.1.	ELO 2.1. ELO 3.1. ELO 3.2. ELO 4.1.	Midterm & Assignment 2	Lecture and self-study
CLO4. To understand the basic principles of inferential statistics	BLO 1.2. BLO 3.1. BLO 3.2 BLO 4.1.	ELO 2.1. ELO 3.1. ELO 3.2. ELO 4.1.	Final exam	Lecture, lab, and self-study
CLO5. To be able to utilize the correct statistical test based on sample, and hypothesis	BLO 1.2. BLO 3.1. BLO 3.2 BLO 4.1.	ELO 2.1. ELO 3.1. ELO 3.2. ELO 4.1.	Final & Assignments 2, 3	Lecture, lab, and self-study
CLO6. To understand the difference between parametric and nonparametric tests	BLO 1.2. BLO 3.1. BLO 3.2 BLO 4.1.	ELO 2.1. ELO 3.1. ELO 3.2. ELO 4.1.	Final exam	Lecture and self-study
CLO7. To be able to apply basic descriptive statistics to available data	BLO 1.2. BLO 3.1. BLO 3.2 BLO 4.1.	ELO 2.1. ELO 3.1. ELO 3.2. ELO 4.1.	Assignment 1	Lecture and lab
CLO8. To be able to apply the appropriate basic inferential statistics to the decision-making process	BLO 1.2. BLO 3.1. BLO 3.2 BLO 4.1.	ELO 2.1. ELO 3.1. ELO 3.2. ELO 4.1.	Final exam, all Assignments	Lecture and lab
CLO9. To be able to make	BLO 1.2. BLO 3.1. BLO 3.2 BLO 4.1.	ELO 2.1. ELO 3.1.	Midterm exam,	Lecture, lab,

generalizations about a population based on a sample from that population		ELO 3.2. ELO 4.1.	Final exam, all Assignments	and self-study
CLO10. To be able to apply statistical techniques to evaluate basic business hypothesis	BLO 1.2. BLO 3.1. BLO 3.2 BLO 4.1.	ELO 2.1. ELO 3.1. ELO 3.2. ELO 4.1.	Midterm exam, Final exam, all Assignments	Lecture and lab

ACADEMIC HONESTY AND INTEGRITY

The ISM University of Management and Economics Code of Ethics, including cheating and plagiarism are fully applicable and will be strictly enforced in the course. Academic dishonesty, and cheating can and will lead to a report to the ISM Committee of Ethics. With regard to remote learning, ISM remind students that they are expected to adhere and maintain the same academic honesty and integrity that they would in a classroom setting.

COURSE OUTLINE

Topic	In-class hours	Readings
Introduction. Study object of statistics. Data collection. Statistical observation. Population and sample. Data structure, variables and measurement. Frequency Distributions. Frequency distributions, frequency distribution tables, frequency distribution graphs, the shape of frequency distributions, percentiles, percentile ranks and interpolation, stem and leaf displays, boxplots	4	Gravetter & Walnau (2009)
Central Tendency. Measures of central tendency: mean, median, mode, central tendency and the shape of the distribution. Variability. Measures of variability: range and interquartile range, standard deviation, variance (population / sample)	4	Gravetter & Walnau (2009)
Introduction to z- Scores. Concept and use of the z-score: z-scores and the location in a distribution, using z-scores to standardize a distribution, other standardized distributions based on z-scores, computing z-scores for a sample	4	Gravetter & Walnau (2009)
Overview of Probability. Brief overview of counting technics in probability, the probability and normal distribution, probabilities and proportions for scores from a normal distribution, probability and the binomial distribution. This will include continuous random variables, the normal distribution, the mean, dispersion and standard deviation of a continuous random variable, the binomial distribution, the exponential distribution.	4	Gravetter & Walnau (2009)
Introduction to Hypothesis Testing. The logic of hypothesis testing, uncertainty and errors in hypothesis testing, directional hypothesis tests, the general elements of hypothesis testing	4	Gravetter & Walnau (2009)
Midterm exam	4	
Introduction to the t Statistic. The t statistic- an alternative to z, hypothesis tests with the t statistic, measuring effect of size for the t statistic, directional test for the t statistic	4	Gravetter & Walnau (2009)

The t Test for Two Independent Samples. Intro to the t statistic for independent measures research design, the assumptions underlying the independent measure t formula		
The t Test for Two Related Samples. Intro to the t statistic related measure design, hypothesis tests and effect size for repeated measures design, uses and assumptions for related measures t tests Estimation. Overview of estimation, estimation with the z statistic, estimation with the t statistic	4	Gravetter & Walnau (2009)
1Introduction to Analysis of Variance. Analysis of variance (ANOVA) is a hypothesis-testing procedure that is used to evaluate mean differences between two or more populations	4	Gravetter & Walnau (2009)
Correlation. Overview of correlation, the Pearson correlation, understanding and interpreting the Pearson correlation, hypothesis tests with correlation, the Spearman correlation	4	Gravetter & Walnau (2009)
Introduction to Regression. Introduction to linear regression, testing the significance of the regression equation, analysis of regression	4	Gravetter & Walnau (2009)
The Chi-Square Statistic: Tests for Goodness of Fit and Independence. Parametric vs nonparametric tests, the chi-square test for goodness of fit / for independence, assumptions and restrictions for chi-square tests, special applications of chi-square test	4	Gravetter & Walnau (2009)
	Total: 48 hours	
CONSULTATIONS	6	
FINAL EXAM	2	

FINAL GRADE COMPOSITION

Type of assignment	%
<i>Group Components 0%</i>	0%
<i>Individual Components 100%</i>	100%
Homework grade	10%
Laboratory grade	15%
Midterm examination	30%
Final examination	45%
Total:	100



DESCRIPTION AND GRADING CRITERIA OF EACH ASSIGNMENT

Students will have to complete **homework assignments** with every topic covered in the course. I will randomly select three assignments, check their solutions and provide feedback to students. The combined grade for homework assignments will comprise **10%** of the final grade.

Students will perform **laboratory work**, using SPSS software, with every topic covered in the course. I will ask students to perform three separate tasks of data analysis in a lab setting and grade their output. The combined grade for the three laboratory tasks will comprise **15%** of the final grade.

A written **midterm examination** will certainly include problem-solving, but might also include true & false and multiple-choice questions on the topics discussed during the lectures of the first half of the course. The midterm will count for the **30%** of the final evaluation.

A written **final examination** will certainly include problem-solving, but might also include true & false and multiple-choice questions on the topics discussed during the lectures of the second half of the course. The final will count for the **45%** of the final evaluation.

RETAKE POLICY

In case of a negative final grade, students can sit for a retake exam. Such an exam will cover all course material. The weight of a retake is 75%. Homework and laboratory grades are not subject to retake but their evaluation (if positive) will count towards the final grade with the retake exam.

REQUIRED READINGS

Gravetter, F. and Wallnau, L., 2009. Statistics For The Behavioral Sciences. 9th ed. Belmont, CA: Wadsworth.

ADDITIONAL READINGS

TBA

DEGREE LEVEL LEARNING OBJECTIVES

Learning objectives for the Bachelor of Business Management

Programmes:

*International Business and Communication,
Business Management and Marketing, Finance,
Industrial Technology Management*

Learning Goals	Learning Objectives
Students will be critical thinkers	BLO1.1. Students will be able to understand core concepts and methods in the business disciplines
	BLO1.2. Students will be able to conduct a contextual analysis to identify a problem associated with their discipline, to generate managerial options and propose viable solutions
Students will be socially responsible in their related discipline	BLO2.1. Students will be knowledgeable about ethics and social responsibility
Students will be technology agile	BLO3.1. Students will demonstrate proficiency in common business software packages
	BLO3.2. Students will be able to make decisions using appropriate IT tools
Students will be effective communicators	BLO4.1. Students will be able to communicate reasonably in different settings according to target audience tasks and situations
	BLO4.2. Students will be able to convey their ideas effectively through an oral presentation
	BLO4.3. Students will be able to convey their ideas effectively in a written paper

Learning objectives for the Bachelor of Social Science

Programmes:

*Economics and Data Analytics,
Economics and Politics*

Learning Goals	Learning Objectives
Students will be critical thinkers	ELO1.1. Students will be able to understand core concepts and methods in the key economics disciplines
	ELO1.2. Students will be able to identify underlying assumptions and logical consistency of causal statements
Students will have skills to employ economic thought for the common good	ELO2.1. Students will have a keen sense of ethical criteria for practical problem-solving
Students will be technology agile	ELO3.1. Students will demonstrate proficiency in common business software packages
	ELO3.2. Students will be able to make decisions using appropriate IT tools
Students will be effective communicators	ELO4.1. Students will be able to communicate reasonably in different settings according to target audience tasks and situations
	ELO4.2. Students will be able to convey their ideas effectively through an oral presentation
	ELO4.3. Students will be able to convey their ideas effectively in a written paper