ISM UNIVERSITY OF MANAGEMENT AND ECONOMICS

STATISTICAL DATA ANALYSIS

Course code	*FUN107*
Compulsory in the programmes	*Finance, Industrial Technology Management, Business Management and Analytics*
Level of studies	*Undergraduate*
Number of credits	*6 ECTS (48 in-class hours + 2 consultation hours + 2 exam hours, 108 individual work hours)*
Course coordinator (title and name)	*Marius Kušlys*
Prerequisites	-
Language of instruction	*English*

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 managerial, 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 principles of descriptive and inferential statistics	BLO1.1.	ELO1.1.	Midterm exam and Final exam	Lectures and self-study
CLO2. To be able to apply basic descriptive statistics to an available data base	BLO1.2., BLO3.2.	ELO3.2.	Midterm exam, Defence of homework 1	Lectures and seminars in computer class, self-study
CLO3. To be able to apply the appropriate basic inferential statistics to the decision making process	BLO1.2., BLO3.2.	ELO1.2., ELO3.2.	Midterm exam, Final exam, Defences of homework 2, 3	Lectures and seminars in computer class, self-study

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
1. Introduction. Study object of statistics. Data collection. Statistical observation. Population and sample. Data structure, research methods and statistics, variables and measurement, statistical notation, ways of obtaining a sample. **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	[1] Ch. 1, 2
2. 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	[1] Ch. 3, 4
3. 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 **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.	4	[1] Ch. 5, 6
4. The Distribution of Sample Means. Probability and the distribution of sample means, standard error. **Introduction to Hypothesis Testing.** The logic of hypothesis testing, uncertainty and errors in hypothesis testing, directional hypothesis tests, the general elements of hypothecs testing.	2	[1] Ch. 7, 8
DEFENCE OF HOMEWORK 1	2	
5. 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. **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.	4	[1] Ch. 9, 10
6. 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.	4	[1] Ch. 11
MIDTERM EXAM	2	
7. Introduction to Analysis of Variance. Introduction to Analysis of variance (ANOVA) for independent-measures design, post hoc tests.	4	[1] Ch. 12
DEFENCE OF HOMEWORK 2	2	
8. Correlation. Overview of correlation, the Pearson correlation, understanding and interpreting the Pearson correlation, hypothesis tests with correlation, the Spearman correlation.	4	[1] Ch. 15
9. Introduction to Regression. Introduction to linear regression, testing the significance of the regression equation, analysis of regression.	4	[1] Ch. 16

10. 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	[1] Ch. 17
11. Hypothesis Tests for Ordinal Data. Mann-Whitney, Wilcoxon, and Kruskal-Wallis tests. **Overview of the course.**	2	[1] Ch. E, 19
DEFENCE OF HOMEWORK 3	2	
	Total: 48 hours	
CONSULTATIONS	2	
FINAL EXAM	2	

FINAL GRADE COMPOSITION

Type of assignment	**%**
Group Components 30%	
Defence of homework 1 (topics 1-3)	10
Defence of homework 2 (topics 5-7)	10
Defence of homework 3 (topics 8-10)	10
Individual Components 70%	
Midterm exam (topics 1-6)	35
Final exam (topics 7-11)	35
Total:	**100**

DESCRIPTION AND GRADING CRITERIA OF EACH ASSIGNMENT

1. The **defences of homework** will count for the 30% of the final evaluation. There will be 3 defences, each worth 10%. During the defence students are expected to perform statistical calculations with SPSS and to answer the questions given by the lecturer on the corresponding topic.
2. The **midterm exam** will count for the 35% of the final evaluation and will include questions on the topics 1-6. Only non-text calculators, provided appropriate tables and formulas will be allowed.
3. The **final exam** will count for the 35% of the final evaluation and will include questions on the topics 7-11. Only non-text calculators, provided appropriate tables and formulas will be allowed.

Students must score for all tasks of the course at the specified time. Postponing of *the defence of homework* is impossible and explicit retake of the *midterm exam* will not be allowed.
Precision of composite evaluations is left intact (up to 2 decimal places) until the end of the course and only the final evaluation will be subject to rounding.

RETAKE POLICY

In case of failing final evaluation, **retake** is possible, but topics will cover the material of the whole course and will comprise 70% of the final grade; midterm exam and final exam results will be annulled; only non-text calculators, provided appropriate tables and formulas will be allowed.

REQUIRED READINGS

1. Gravetter F. J., Wallnau L. B. (2013). Statistics for the Behavioral Sciences (9th Edition). Toronto: Thompson.

ADDITIONAL READINGS

2. Elliot A. C., Woodward W. A. (2007). Statistical Analysis Quick Reference Guidebook: With SPSS Examples.
3. Weiss N. A. (2008). Elementary Statistics (7th Edition). Boston: Pearson Education.
4. Lind D. A., Marchal W. G., Wathen S. A. (2010). Basic Statistics for Business and Economics. New York: McGraw.

ANNEX

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