UNIVERSITY OF ECONOMICS - VARNA

FACULTY OF INFORMATICS

DEPARTMENT OF STATISTICS AND APPLIED MATHEMATICS

Adopted by the FC (record №8 / 05.03.2020)
Adopted by the DC (record №7 / 17.02.2020)

ACCEPTED BY:
Dean:
(Prof. Vladimir Sulov, PhD)

SYLLABUS

SUBJECT: "INTRODUCTION TO STATISTICS";

DEGREE PROGRAMME: "International Business", "Business and Management" and "Accounting"; BACHELOR`S DEGREE

YEAR OF STUDY: 2; SEMESTER: 4;

TOTAL STUDENT WORKLOAD: 270 hours; incl. curricular 75 hours

CREDITS: 9

DISTRIBUTION OF STUDENT WORKLOAD ACCORDING TO THE CURRICULUM

TYPE OF STUDY HOURS	**WORKLOAD, hours**	**TEACHING HOURS PER WEEK, hours**
CURRICULAR: incl. • LECTURES • SEMINARS (lab. exercises)	 45 30	 3 2
EXTRACURRICULAR	195	-

Prepared by:

1. **……..**
(Prof. Veselin Hadzhiev, PhD)

2. **……**
(Ch. Assist. Prof. Svetlana Todorova, PhD)

Head of department
of Statistics and Applied Mathematics: ……..
(Prof. Rosen Nikolaev, PhD)

I. ANNOTATION

The Introduction to Statistics course offers students an opportunity to obtain the necessary skills to collect, summarize, analyze, present and interpret business-related data. It covers descriptive statistics, sampling and sampling distributions, statistical inference, relationships between variables, formulating and testing hypotheses, and regression analysis in the context of business and economics. The Introduction to Statistics course is based on a combination of lectures and computer-lab practice and class sessions will be in an interactive lecture/discussion format.

The objective of this course is to provide students with an understanding of statistical methods and techniques and their usefulness in the decision-making process. Use of the Excel's Data Analysis ToolPak is an integral part of the course.

II. THEMATIC CONTENT

№	TITLE OF UNIT AND SUBTOPICS	NUMBER OF HOURS		
		L	S	L.E.
Theme 1. Introduction to Statistics		**3**	**2**	
	Course Introduction and Objectives. Definition of Statistics			
	Statistical Terminology: Population, Sample, Population Parameter and Sample Statistics			
	Descriptive versus Inferential Statistics			
	Types of Variables (Quantitative and Qualitative)			
	Cross-sectional versus Time-series Data			
	Scales of Measurement (Nominal, Ordinal, Interval and Ratio)			
	Data Sources			
	Applications of Statistics in Business and Economics			
Theme 2. Descriptive Statistics: Tabular and Graphical Presentations		**3**	**2**	
	Summarizing Qualitative Data			
	Summarizing Quantitative Data			
	Scatter Diagram			
Theme 3. Numerical Descriptive Measures		**6**	**4**	
	Measures of Central Tendency: Mode, Median, and Mean			
	Measures of Location: Quartiles and Percentiles			
	Measures of Dispersion (Variability): Range, Interquartile Range, Variance, Standard Deviation, and Coefficient of Variation			
	Measures of Distribution Shape and Boxplot			
	Measures of Association between Two Variables			
Theme 4. Introduction to Probability and Discrete Probability Distributions		**3**	**2**	
	Fundamental Probability Concepts and Counting Rules. Contingency Tables and Probabilities			
	Random Variables and Discrete Probability Distributions			
	Expected value, Variance, and Standard Deviation			
	Binomial Probability Distribution			
Theme 5. Continuous Probability Distributions		**3**	**2**	
	Continuous Random Variables			
	Normal Probability Distribution			
	Solving Problems with Normal Distributions			
	Normal Approximation of Binomial Probabilities			
Theme 6. Sampling and Sampling Distributions		**3**	**2**	

	Non-probability and Probability Sampling			
	Simple Random Samples			
	The Sampling Distribution of the Sample Mean			
	The Sampling Distribution of the Sample Proportion			
Theme 7. Interval Estimation		**3**	**2**	
	Confidence Interval for a Population Mean - Use of the Normal and the t-distribution			
	Confidence Interval for the Population Proportion			
	Selecting the Required Sample Size			
Theme 8. Hypothesis Testing		**3**	**2**	
	Introduction to Hypothesis Testing: One and Two- tailed Tests; Type I and Type II Errors			
	Hypothesis Testing for a Population Mean- Use of the Normal and the t-distribution			
	Hypothesis Testing for a Population Proportion			
	Relationship between Interval Estimation and Hypothesis Testing			
Theme 9. Statistical Inference Concerning Two Populations		**3**	**2**	
	Inference Concerning the Difference between Two Means: Independent Samples			
	Inference Concerning Mean Differences: Mached Samples			
Theme 10. Additional Inferences		**3**	**2**	
	Analysis of Variance: One-way ANOVA			
	Chi-squared Test of Independence			
Theme 11. Regression Analysis		**6**	**4**	
	Introduction to Simple Linear Regression and Correlation: Determining the Equation of the Regression Line			
	Model Assumptions and Residual Analysis			
	Multiple Linear Regression			
	Goodness-of-fit Measures: the Standard Error of the Estimate, the Coefficient of Determination R^2, Tests of Significance			
Theme 12. Time-Series Analysis and Forecasting		**3**	**2**	
	Introduction to Time-series Analysis and Forecasting			
	Time-series Components (Trend Component, Seasonality Component, Cyclical Component, and Irregular Component)			
	Regression Trend Analysis and Forecasting			
Theme 13. Index Numbers		**3**	**2**	
	Simple Price Indices			
	Weighted Aggregate Price Index			
	Index of Volume			
	Total:	**45**	**30**	

III. FORMS OF CONTROL:

№	TYPE AND FORM OF CONTROL	Number	extracur-ricular, hours
1.	**Midterm control**		
1.1.	Midterm Exams	2	40
1.2.	Quizzes	3	40
1.3.	Project	1	40
	Total midterm control:	**6**	**120**
2.	**Final term control**		
2.1.	Examination – Final Exam	1	75
	Total final term control:	**1**	**75**
	Total for all types of control:	**7**	**195**

IV. LITERATURE

REQUIRED (BASIC) LITERATURE:

1. Newbold, Paul. William L. Carlson and Betty M. Thorne. *Statistics for business and economics*. 8th edition, Pearson, 2013.
2. Mann, Prem S. *Introductory Statistics*. 8th edition, Singapore: John Wiley & Sons Ltd, 2013. (*Varna University of Economics Library*)
3. Weiss, Neil A. *Introductory Statistics*. 9th edition, Edinburgh: Pearson, 2014. (*Varna University of Economics Library*)

RECOMMENDED (ADDITIONAL) LITERATURE:

1. Lee, Nick, Mike Peters. *Business Statistics Using EXCEL and SPSS*. Los Angeles: SAGE Publisher, 2016. (*Varna University of Economics Library*)
2. Jaggia Sanjiv, Alison Kelly, *Business Statistics – Communicating with Numbers*, 2nd edition, McGraw-Hill Publishers, 2016
3. Anderson, David. Dennis J. Sweeney, Thomas A. Williams, Jeffry D. Camm, and James J. Cochran, *Statistics for Business and Economics*, 13th edition, Publisher: CENGAGE Learning, 2017
4. Ken Black (Wiley), *Business Statistics for Contemporary Decision Making*, 8th edition, Publisher: Wiley Plus, 2014