Course Name : Statistics

Course Code	Course Type	Regular Semester	Lecture (hours/week)	Seminar (hours/week)	Lab. (hours/week)	Credits	ECTS
EMS 212	A	Spring	3.00	1.00	0.00	3.50	5.00

Lecturer	Kevin Bica, Msc
Assistant	
Course language	English
Course level	Bachelor
Description	Statistics is a course that introduces statistical concepts and methods commonly used in business and economics. The course aims to equip students with the skills to collect, analyze, and interpret data to make informed decisions. Students will learn to use statistical software to analyze data and be introduced to various statistical techniques, including probability theory, descriptive statistics, hypothesis testing, and regression analysis. The course will also cover topics related to sampling and estimation, statistical inference, and decision-making under uncertainty. By the end of the course, students will have a solid understanding of how to apply statistical methods in real-world business and economic situations.
Objectives	- To provide an understanding of basic statistical concepts and methods used in business and economics. - To introduce students to statistical techniques, including probability theory, descriptive statistics, hypothesis testing, and regression analysis. - To teach students how to collect and analyze data to make informed business and economic decisions. - To provide an understanding of statistical inference and decision-making under uncertainty. - To teach students how to apply statistical methods in real-world business and economic situations. - To develop critical thinking skills through the analysis and interpretation of data. - To prepare students for further study in business and economics and related fields such as finance and marketing.
Core Concepts	- Data types (categorical, numerical) - Measures of central tendency (mean, median, mode) - Measures of dispersion (range, variance, standard deviation) - Probability theory - Random variables - Normal distribution - Hypothesis testing - Confidence intervals - Correlation and regression - Sampling techniques

Course Outline

Week	Topic
1	Introduction to the Statistics Course. Syllabus and Textbook presentation.
2	Statistics, Data, and Statistical Thinking. Chapter 1 (pg. 25-55). This chapter covers the basics of statistics, including an introduction to data and the importance of statistical thinking. The chapter explains the various types of data and how they can be collected, as well as the different levels of measurement. Additionally, it discusses the importance of using statistical methods to analyze data and make informed decisions based on data-driven insights. Overall, this chapter is an essential foundation for anyone looking to develop a deeper understanding of statistics and its applications.
3	Methods for Describing Sets of Data. Describing Qualitative Data. Chapter 2 (pg. 63-87). This section shelters various techniques for summarizing and describing qualitative data. This includes organizing data into frequency tables, calculating percentages, and creating graphical representations like bar and pie charts. The chapter also discusses central tendency and variability measures, which help quantify and compare data sets. Overall, this chapter provides a solid foundation for understanding and presenting qualitative data.

4	Numerical Measures of Central Tendency. Numerical Measures of Variability. Using the Mean and Standard Deviation to Describe Data. Chapter 2 (pg. 87-113). Chapter 2 covers numerical central tendency and variability measures, including mean, median, mode, range, variance, and standard deviation. This section explains the calculation and interpretation of these measures and their use in describing data. It provides fundamental knowledge in statistics and data analysis.
5	Numerical Measures of Relative Standing. Methods for Detecting Outliers. Chapter 2 (pg. 113-135). This section explains different statistical measures used to analyze the relative position of an observation within a dataset and how to identify and deal with outliers in the data. The chapter provides an overview of various techniques that can be used to detect outliers, such as box plots, scatter plots, and z-scores, among others, and it aims to equip students with the necessary knowledge and tools to understand better and analyze their data sets.
6	Probability. Events, Sample Spaces, and Probability. Unions and Intersections. Chapter 3 (pg. 156-175). Chapter 3 of the book comprises the fundamentals of probability theory. The chapter discusses events, sample spaces, and probability and explains how to calculate the likelihood of an event occurring. It also covers unions and intersections of events, which are essential concepts in probability theory. By the end of the chapter, students should have a solid understanding of probability theory basics, which will be useful in many fields.
7	Quiz and Review
8	Midterm
9	Probability. Conditional Probability. Baye’s Rule and The Multiplicative Rule and Independent Events. Chapter 3 (pg. 175-197). The second section of the third chapter includes the fundamental concepts of probability theory, such as conditional probability, Bayes' rule, the multiplicative rule, and independent events. These concepts are essential in the field of statistics and are widely used in many areas including science, engineering, economics, and social sciences. The chapter provides a comprehensive overview of these concepts and their applications in real-world scenarios.
10	Random Variables and Probability Distributions. Discrete Random Variables. Chapter 4 (pg. 213-228). Chapter 4 covers the concept of random variables and probability distributions, focusing specifically on discrete random variables. It delves into the analysis of outcomes that have distinct, separate values, and explores the probability distributions associated with these variables.
11	Discrete Random Variables. The Binominal Distribution. Chapter 4 (pg. 228-241). This section of chapter involves the topic of discrete random variables and specifically explores into the binomial distribution. It explores the characteristics and applications of these variables and distribution, providing a foundational understanding of this important concept in probability and statistics.
12	Continuous Random Variables. Probability Distributions. Chapter 4 (pg. 248-266). The second section involves the topic of continuous random variables and probability distributions. It discusses the properties of continuous random variables and how to calculate probabilities using probability density functions. Additionally, the chapter covers important concepts such as expected values and variances of continuous random variables, as well as the normal distribution and its applications in real-world scenarios.
13	Sampling Distributions. Chapter 5 (pg. 297-316). Chapter 5, Sampling Distributions, discusses the concept of sampling distributions in statistics. It explains how a sample statistic can be used to estimate a population parameter. The chapter covers various topics like the central limit theorem, standard error, and confidence intervals. It also includes practical examples to help understand the material better.
14	Inferences Based on a Single Sample: Estimation with Confidence Intervals. Chapter 6 (pg. 330-347). Chapter 6 explores the concept of making inferences based on a single sample, focusing on estimation with confidence intervals. The chapter explores the methods and techniques used to estimate population parameters and construct confidence intervals, providing a comprehensive understanding of this fundamental statistical process.
15	Project Evaluation and Review for Final Exam.
16	Final Exam

Prerequisites	The student must attend the course at a minimum rate of 75%.
Literature	• • McClave, J. T., Benson, P. G., & Sincich, T. (2021). Statistics for Business and Economics (14th ed.). Pearson.
References	• Anderson, D. R., Sweeney, D. J., Williams, T. A., Camm, J. D., & Cochran, J. J. (2019). Statistics for Business & Economics (14th ed.). Cengage Learning. • Lind, D. A., Marchal, W. G., & Wathen, S. A. (2018). Statistical techniques in business and economics. McGraw-Hill Education. • Keller, G. (2015). Statistics for Management and Economics (10th ed.). Cengage Learning. • Doane, D. P., & Seward, L. E. (2019). Applied Statistics in Business and Economics (6th ed.). McGraw-Hill Education.

Course Outcome

1	To develop understanding of statistical concepts and methods
2	To acquire skills to collect, analyze, and interpret data
3	To gain knowledge related to sampling, estimation, and decision-making.
4	To apply statistical methods in real-world situations.
5	To learn various statistical techniques and develop critical thinking skills.

Course Evaluation

In-term Studies	Quantity	Percentage
Midterms	1	30
Quizzes	0	0
Projects	1	20
Term Projects	0	0
Laboratory	0	0
Class Participation	1	10
Total in-term evaluation percent		**60**
Final exam percent		**40**
Total		**100**

ECTS Workload (Based on Student Workload)

Activities	Quantity	Duration (hours)	Total (hours)
Course duration (Including the exam week: 16x Total hours of the course)	16	4	64
Study hours outside the classroom (Preparation, Practice, etc.)	14	3	42
Duties	1	4	4
Midterms	1	5	5
Final Exam	1	7	7
Other	0	0	0
Total Work Load			**122**
Total Work Load / 25 (hours)			**4.88**
ECTS			**5.00**