TEACHING GUIDE - 2026-2027

Statistics for Decision Making Based on Data Analysis

UGRA_016412

Departments	Data, Analytics, Technology and Artificial Intelligence (DATA)
Teaching Languages	English
ECTS	6
Teacher responsible	Vicenta Sierra Olivera - vicenta.sierra@esade.edu

Course Goals

1. Problem Framing and Decision Context

- Translate business problems into data-driven analytical questions.
- Apply statistical reasoning to real-world business problems and decision-making under uncertainty.
- Draw connections between statistical analysis and key business domains (e.g., Marketing, HR, Strategy), understanding its role in managerial practice.

2. Analytical Tools and Methods

- Make inferences about unknown population parameters using estimation and confidence intervals.
- Formulate and test hypotheses using appropriate inferential procedures.
- Select and apply appropriate statistical techniques for tasks such as prediction, segmentation, and data exploration.
- Use statistical software tools (e.g., SPSS, Jamovi, R) to conduct analyses.

3. Interpretation, Critical Thinking, and Communication

- Interpret statistical outputs and translate them into actionable business insights.
- Recognize and critically evaluate the assumptions, limitations, and potential biases of statistical methods.
- Assess the reliability of data-driven insights before using them in business decisions.
- Communicate analytical findings in a clear and business-oriented manner.

Previous knowledge

Descriptive Statistics and Probability

Prerequisits

Descriptive Statistics and Probability

Teaching methodology

The course combines conceptual understanding with applied analysis in business contexts. Through lectures, guided discussions, practical exercises, and case-based activities, students develop statistical reasoning and data-driven decision-making skills.

The teaching methodology integrates the theoretical foundations of inferential statistics with their application to real and simulated business situations. Students learn to analyze data, interpret results, and evaluate the validity of statistical evidence to support managerial decisions.

Throughout the course, emphasis is placed on linking statistical methods to practical business challenges. Students are expected not only to conduct rigorous analyses but also to critically assess their findings and translate them into meaningful managerial insights and recommendations.

Description

Course contribution to program

This subject contributes to the BBA program by developing students' ability to make evidence-based decisions in business environments characterized by uncertainty and increasing data availability. It provides the statistical foundations necessary to transform data into meaningful information and managerial knowledge, strengthening students' analytical and quantitative reasoning skills.

Through the study and application of inferential and selected multivariate statistical techniques, students learn how to analyze business data, evaluate empirical evidence, identify patterns and relationships, and draw sound conclusions to support decision-making across different functional areas, including marketing, human resource management, and operations.

The subject also contributes to the development of effective communication skills by training students to interpret, synthesize, and present analytical results in a clear and meaningful way. As a result, students are better prepared to translate quantitative findings into actionable business insights and recommendations, enabling them to communicate effectively with both technical and non-technical stakeholders.

Short description

Data alone does not drive decisions; insight does. This course equips students with the statistical thinking and analytical tools needed to

interpret data, manage uncertainty, and make evidence-based decisions in increasingly data-driven business environments.

Program Learning Objectives

BBA25-Bachelor of Business Administration (BBA)

- Critical and Analytical Thinking
  - Apply data analysis as an integral part of the evaluation and decision-making process.
- Communication Skills
  - Communicate ideas and arguments effectively in written form.

Bibliography

Newbold, P.; Carlson, W. L.; Thorne, B.,, Statistics for Business and Economics, Pearson - Prentice Hall, 10: 8483224038 (Book)

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C., Multivariate Data Analysis, Prentice Hall (Book)

Activities

Online training activities
Completion of microlearning modules through the Snackson platform to reinforce key concepts and support continuous learning.

Analytical exercises
Application and interpretation of statistical techniques to analyze data and extract insights relevant to business decision-making.

Written and/or oral exams
Assessment of students' ability to apply statistical techniques, interpret results, and solve business-related analytical problems.

Quizzes/tests
Completion of quizzes and continuous assessment activities to monitor understanding of statistical concepts and methods.

Practical exercises with professional software
Hands-on statistical analyses using specialized software for data management, visualization, and interpretation.

Case study analyses
Examination of real or simulated business situations in which data is used to support managerial decision-making.

Content

#	Topic
1	Sampling Distributions Introduction to sampling distributions and their role in statistical inference. Analysis of the distributions of sample means, proportions, and variances as a foundation for estimation and hypothesis testing.
2	Estimation Principles of statistical estimation, including point estimation and confidence intervals. Emphasis on quantifying uncertainty and drawing conclusions about population parameters from sample data.
3	Hypothesis testing. Fundamentals of statistical hypothesis testing, including p-values, statistical power, and tests for means, variances, and proportions. Introduction to Analysis of Variance (ANOVA).
4	Non-parametric methods. Non-parametric statistical techniques for situations where classical assumptions may not hold. Includes goodness-of-fit tests and chi-square tests of independence and homogeneity.
5	Dependency techniques. Introduction to dependency techniques used to analyze and model relationships between variables. Covers simple and multiple linear regression, with an emphasis on explanation, prediction, and the interpretation of business phenomena.
6	Interdependency techniques. Introduction to interdependency techniques used to explore underlying structures in data without distinguishing between dependent and independent variables. Covers principal component analysis and cluster analysis for data reduction, pattern identification, and market segmentation.

Assessment

Tool	Assessment tool	Category	Weight %
Written and/or oral exams	Exam 1 – Statistical Inference. Written examination covering Sampling Distributions, Estimation, Hypothesis Testing, and Non-Parametric Methods.	Retake and ordinary round	40.00%
Written and/or oral exams	Exam 2 – Multivariate analysis. Written examination covering dependency and interdependency techniques	Retake and ordinary round	40.00%
Quizzes/tests	Content Integration Multiple-choice test 1. Multiple-choice assessment covering sampling distributions and estimation	Retake and ordinary round	20.00%

PROGRAMS

BBA25-Bachelor of Business Administration (BBA) (Undergraduates: Business)
BBA25 Year 2 (Mandatory)

GBD25-Double Degree in Business Administration and Law (Undergraduates: Law)
GBD25 Year 2 (Mandatory)

GBL25-Double Degree in Business Administration and Global Governance, Economics and Legal Order (Undergraduates: Business)
GBL25 Year 2 (Mandatory)