

**COMILLAS**

UNIVERSIDAD PONTIFICIA

ICAI

ICADE

CIHS

Syllabus
2026 - 2027**TECHNICAL SHEET OF THE SUBJECT**

Data of the subject	
Subject name	Data Analysis for Decision Making
Subject code	E000011576
Main program	Official Master's Degree in Business Administration - MBA
Involved programs	Máster Universitario en Administración de Empresas (MBA) [First year]
Level	Posgrado Oficial Master
Quarter	Semestral
Credits	3,0 ECTS
Type	Obligatoria
Department	Departamento de Métodos Cuantitativos
Coordinator	Alejandro Pérez Calvo
Schedule	Check 26-27 calendar
Office hours	Upon request: apcalvo@comillas.edu
Course overview	Effective management of organizations requires recognizing the contributions that quantitative and analytical methods can make in bringing rationality to decision-making processes. In the context of this subject, a series of analytical tools and techniques commonly used in management and business are presented. This allows participants to become aware of which analytical techniques are available for decision-making, helps them appreciate the contribution these tools and techniques can make to effective decision-making, and also leads to an understanding of the limitations these analytical methods may have. The emphasis throughout the class is on the conceptual understanding of the tools and techniques rather than on the development of analytical skills. The course also considers the responsible and ethical use of data in decision-making, including issues such as privacy, bias, fairness, transparency, and accountability. Participants are encouraged to recognize that business problems ca

Teacher Information	
Teacher	
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SPECIFIC DATA OF THE SUBJECT

Contextualization of the subject
Contribution to the professional profile of the degree
The course in the professional context The effective management of organizations requires knowledge of the contributions that quantitative and analytical methods can have when it comes to providing rationality to decision-making processes. In the context of this subject a series of analytical tools and techniques commonly used in the field of management and business are presented.



Course objectives

- Provide students with the ability to analyze information and data as key elements for decision-making and the identification, formulation and resolution of business problems.
- Learn to do a basic descriptive treatment of a set of data, know how to extract conclusions from the same regarding the behavior of certain variables and be able to model simple economic phenomena.
- Provide students with the ability to analyze problems of the company and its environment using quantitative methods, distinguish appropriate analysis and modeling techniques and apply them to practical cases of prediction and simulation in business management.
- Provide students with a framework for understanding core data-related responsibilities such as:
 - Measurement: Determining the impact of business efforts and marketing campaigns
 - Optimization: Recommending changes in tactics or spending to improve results
 - Experiments: Designing and executing tests to isolate causes
 - Segmentation: Identifying groups and subgroups of customers and prospects
 - Predictive modeling: Building models to improve performance rates
 - Storytelling: Communicating messages derived from data to inspire better decisions
 - Understand the importance of digital transformation and business technologies applied to data analysis
 - AI-enabled solutions: Understanding how artificial intelligence and generative AI can complement traditional analytical tools to automate analysis, identify patterns, generate insights, and support data-driven decision-making

Prerequisites

Those students without prior training in data analysis should take 2 credits of additional training in the field in order to homogenize starting levels

Competencies - Objectives

Competences

GENERALES

CG01	Analytic and synthesis cognitive capacities applied to business situations and managing and organisation problems.
CG02	Management of data and information as key elements for decision-making and for identification, formulation and resolution of business problems.
CG03	Problem-solving and decision-making skills at a strategic, tactic and operational level with regard to a business, considering the interrelationship between the different functional and business areas.
CG09	Knowledge, understanding and handling of tools for diagnosis of the competitive position of a company, and designing and executing the company's strategic plan.

ESPECÍFICAS

CE09	Being able to analyse the problems of the company and its environment through the understanding of data and information – their nature, collection, storage, modelling and extraction – and through the use of quantitative methods, and to identify appropriate analysis and modelling techniques and apply these same techniques to predictive and simulation case studies of business management.
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THEMATIC BLOCKS AND CONTENTS

Contents - Thematic Blocks

MODULE 1: Business Data analysis

- Basics of Data Analytics
- Conducting Data Analytics for Businesses
- Data Analysis in the era of Big Data
- Artificial Intelligence applied to Data Analysis
- Ethics in Data & Analytics

MODULE 2: The Analytics Lifecycle

- Data Discovery, Preparation and Model
- Communicating Results
- The importance of "Thinking differently"

MODULE 3: Basic Descriptive Data Analysis

- Descriptive and Inferential Statistics
- KPIs, Metrics and Dashboards

MODULE 4: Risks of Data Analytics

- Uncertainty and Risk
- Probability Rules and Adjustments
- Business Challenges

MODULE 5: Analytical Methods: from time series to social media analysis

- Regression
- Classification
- Other Methods: Time Series, Text , Social and Sentiment Analysis

MODULE 6: Grouping the similar: Clustering

- Clustering overview
- K-means and Use Cases
- Real World examples

MODULE 7: Data Visualization and Technology

- Data Visualization basics
- Improving Data Visualization and Understanding
- Technology and Tools

**TEACHING METHODOLOGY**

General methodological aspects of the subject	
In-class Methodology: Activities	
- Teaching lectures - Development of exercises and examples - Guided practice of cases applying the concepts learnt - Oral presentation of the applied practical cases done in group - Presentations by top industry professionals (guest speakers)	CG01, CG02, CG03, CG09, CE09
Non-Presential Methodology: Activities	
- Tutored personal work - Individual and group practice work - On-line assessment / tests	CG01, CG02, CG03, CG09, CE09

SUMMARY STUDENT WORKING HOURS

CLASSROOM HOURS		
Analysis and resolution of cases and exercises, individually or collectively	Lessons of an expository nature	Oral presentations of topics, cases, exercises and papers
10.00	10.00	10.00
NON-PRESENTIAL HOURS		
Analysis and resolution of cases and exercises, individually or collectively	Collaborative learning	
35.00	10.00	
ECTS CREDITS: 3,0 (75,00 hours)		

EVALUATION AND CRITERIA

The use of AI to produce full assignments or substantial parts thereof, without proper citation of the source or tool used, or without explicit permission in the assignment instructions, will be considered plagiarism and therefore subject to the University's General Regulations.

Evaluation activities	Evaluation criteria	Weight
Final exam	To pass the subject, the student should obtain at least the following: Final exam: 5/10	50 %
Public oral presentation (Group project)	Quality of the presentation and content. Min. score to pass: 5/10	15 %



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Discussion questions	Active participation, Min. score to pass: 5/10	15 %
Cases & Exercises	Knowledge of the subject. Min. score to pass: 5/10	20 %

Ratings

To pass the subject, students must obtain at least the following minimum grades:

- Final exam: 5/10
- Cases and exercises: 5/10
- Public oral presentation: 5/10
- Active participation in discussion questions: 5/10
- Overall grade: The total weighted grade across all assessment components must be equal to or higher than 5/10

Students who do not pass the subject will be required to:

- a) Retake the final exam if they fail to achieve the minimum required grade in the exam
- b) Repeat the oral presentation on a new topic if they fail to achieve the minimum required grade in any of the other assessment components, in accordance with the assessment criteria established for the subject

Students with an Attendance Waiver:

Students with an attendance waiver will be required to take the final exam, which will account for 100% of their grade. Nevertheless, participation in other available online activities is highly recommended as a means of supporting their learning and improving their preparation for the final assessment.

Use of Artificial Intelligence (AI)

The use of AI technologies, including generative AI tools, is permitted within the specific parameters established for each activity and subject to the conditions and instructions provided by the instructor. Students are responsible for ensuring that their use of AI complies with these requirements.

AI tools should be used as a support for learning, analysis, and problem-solving, rather than as a substitute for the student's own reasoning, critical thinking, or individual work.

When required, students must be able to explain, justify, and critically assess any content, analysis, or conclusions produced with the assistance of AI.

Any use of AI outside the permitted parameters, as well as the submission of AI-generated content as the student's own work when this is not specifically allowed, may be treated as a breach of academic integrity. The corresponding plagiarism and academic integrity protocols will be applied to exercises, individual cases, and other assessed work.

AI usage level allowed: Allowed with specific condition



BIBLIOGRAPHY AND RESOURCES

Basic Bibliography

- Class notes
- Handouts & slides
- External resources
- Books

"Quantitative Analysis for Decision Makers, 7th Edition" (formerly known as Quantitative Methods for Decision Makers), 7th Edition. MIK WISNIEWSKY. Pearson (2020). ISBN-13: 9781292276663

Complementary Bibliography

"Everyday Business Storytelling: Create, Simplify, and Adapt A Visual Narrative for Any Audience". JANINE KURNOFF, LEE LAZARUS. Ed. Wiley (2021). ISBN 978-1119704669

"Big Data: Using Smart Big Data, Analytics and Metrics to Make Better Decisions and Improve Performance". BERNARD B. MARR Ed. John Wiley & Sons (2015). ISBN 978-111-89-6583-2

"Data Science for Business: What you need to know about data mining and data-analytic thinking". FOSTER PROVOST Ed. O'Reilly Media (2013). ISBN 978-144-93-6132-7

"Data Science& Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data". EMC EDUCATION SERVICES. Wiley (2015). ISBN:9781118876138

"Artificial Intelligence: A Modern Approach". RUSSELL STUART, NORVIG PETER. Ed. Pearson Series in Artificial Intelligence (2020). ISBN 978-0134610993

Online resources:

<https://www.datasciencecentral.com/>

<https://colab.google/>

<https://www.kdnuggets.com/>