# Business analytics

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***COURSE AIMS AND INTENDED LEARNING OUTCOMES***

The course aims to develop knowledge and skills on how to design and understand data analysis based on statistical methodology and results of statistical models in real world business applications.

At the end of the course, students will be able to:

1. choose and apply, by using the statistical software SPSS, the right statistical tool to recover and summarize information from the different kind of data.
2. Answer to business research questions using the statistical techniques presented during the course.
3. Identify and interpret the theoretical and conceptual foundations of exploratory data analysis, data modeling for information representation, sustainable and ethical decision making in business applications.
4. Systematically categorize and correctly frame real world business challenges through data modeling, analysis and visualization.
5. Identify and interpret the theoretical and conceptual foundations to critically recognize the modern challenges related to complex modeling methods based on machine learning for business applications.
6. Understand the implications and the causal chain that connects business plans, data strategies and individual behavioral patterns towards data.
7. Develop managerial decision making by recognizing, assessing and analyzing complementary or competitive decisional options to address data driven insights and the subsequent ethical and sustainable business solutions.

Module 1

The aim of the first module is that of getting the students started in research methods in the fields of quantitative business and marketing. The goal is to learn and implement statistical techniques that can lead to data-driven decisions. The course is interdisciplinary and will concentrate on data analysis mostly from an applied perspective. By using the software SPSS ([https://www.ibm.com/it-it/spss](https://powerbi.microsoft.com/)) and Power BI ([https://powerbi.microsoft.com](https://powerbi.microsoft.com/)), we face the analysis to manipulate data, to create visualizations, and to apply statistical models for highlight the relationships between variables.

Module 2

The second module of this course will be based on actual real world business problems and challenges. Through case histories, business cases and use cases students will be shown and taught about data strategies, their pillars, about analytics and how to utilize the quantitative mindset and skills acquired within the first module in everyday’s business challenges. Students will get the chance to see how quantitative reasoning and methods can be applied to correctly frame ethical and sustainable solutions to business problems on one hand as well as how to let data support and guide managerial decision-making processes on the other hand.

Starting from the definition of Analytics and Data Strategy students will be guided through their different types and pillars and learn how to evaluate and bridge gaps between desired and actual behaviors towards data with regards to different professionals. Focus will be put on learning how data can -and in fact always ends up being- treated in a variety of ways by different professional figures and on the impact that the different behavioral patterns towards data generate on business processes, sustainable decision making and ultimately business outcomes.

***COURSE CONTENT***

Module 1 (*Data Analysis and visualization*) - Luca Bagnato

* Introduction to SPSS and Power BI
* Review of descriptive statistics and inference
* Review of Matrix Algebra
* Simple and multiple linear regression
* The chi-squared test of independence
* Cluster analysis
* Independent samples t-test and Anova

Module 2 (*Analytics and Data Strategy*) - Imanuel Baharier

* Data Strategy and Analytics
* Descriptive and Diagnostic Analytics
* Predictive and Prescriptive Analytics
* Corporate Strategy and Data Strategy Alignment
* HR, Leadership and Communication
* Ethics
* Data Literacy and Data Culture
* Wrap-Up

***TEACHING METHOD***

A blend of lectures, coding and data analysis (60 hours). Theory will be followed by many hands-on exercises. Moreover, guests will attend and describe real world business cases and situations. Laptop is required to attend the lessons to have the opportunity to try the concepts being explained.

***ASSESSMENT METHOD AND CRITERIA***

Students are evaluated through *two* written tests, *one per module*. Students can choose between a multiple and a single assessment. In the “multiple assessment” both tests are scheduled to the end of each module, that is, one test at the end of module 1, and the other test at the end of module 2. The final mark is computed as the simple mean of the two grades reported in written tests, rounded to the nearest integer. The following conditions must be met: (i) the two written tests are mandatory; (ii) each test must be a pass (i.e., each test grade must be at least 18). Even though attendance is not mandatory for a PASS in the multiple assessment, it is strongly recommended. Students who do not pass the multiple assessment are evaluated according to the single assessment. The “single assessment” consists in a single written exam containing two tests, *one per module*. Structures and Contents of the assessments (multiple and single), for each module, are reported below.

The exam procedure is the same in each exam session and applies to attending and non-attending students.

Module 1 (*Data Analysis and Visualization*) - Luca Bagnato

First module test consists of a written exam using the Personal Computer. The exam consists in solving two empirical exercises (50% of the test grade each) related to two different datasets. Each exercise contains four/five questions whose points are reported in the exam test (exam simulations are provided on Blackboard). In particular, the students will use SPSS and Power BI providing a word document (a report) containing answers and comments about the different applications

Module 2 (*Analytics and Data Strategy*) - Imanuel Baharier

Second module test consists of a number of open questions (weights: equal weight for each question totalling 66% of the test grade), and a case study (weights: 34% of the test grade).

***NOTES AND PREREQUISITE****S*

**Prerequisites.** The course requires previous experience in statistics at the level of undergraduate courses usually taught in Italian universities.

N. ECTS – 8

Enrollment requirements – Familiarity with algorithms

Language of instruction – English

Time –7.5 hours per lecture week (7.5 x 8 weeks = 60 hours in total). Out-of-class activities: 4 hours to prepare required readings each week (4 hours x 8 weeks = 32 hours); self-study (108 hours).

Attendance – Even though attendance is not mandatory for a PASS, it is strongly recommended.

Associated courses – Mathematics for management

International dimension – International teaching materials are used throughout the course.

Business connection - The course makes extensive use of contemporary business cases and examples, with a focus on problem solving and decision making. Actual business cases are discussed and analyzed. A hands-on approach both in teaching and during class interactions is utilized.

Professional context – Data analysis is essential for informing business strategies, policies, and complex decision making. Banks, Insurance Companies, Retail companies and Digital Corporation are implementing data driven transformation processes to completely change their approach to markets and competition. This transition creates a strong demand for soft and hard data related skills from all employees within all career levels through the organizations. New hires as well as established managers are and will be required to evolve their approach to data to thrive within the new organization landscape that is being shaped.

Further information – Additional information regarding the course schedule and delivery, learning assessment, expectation and policies, general announcements, and additional course materials will be posted on Blackboard.