



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## SYLLABUS DEL CORSO

### Big Data in Economics

2425-2-FDS01Q021-FDS01Q021M

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#### Learning objectives

The course aims to develop the skills to apply data analysis to economic and business problems.

Specifically, it analyzes with case studies and datasets three fundamental problems: causal effects, prediction, and unsupervised classification.

In general, the educational objectives fall within the areas of data science, computer science, and statistics related to businesses.

#### Contents

The course is divided into 4 parts.

The first part discusses the role of big data within the firm and the new challenges. The remaining three parts of the course separately discuss the three main areas of application (causality, prediction and unsupervised classification) with specific examples mainly concerning risk management and consumer choices.

Finally, in hands-on lab students learn to develop R algorithm for data analysis.

#### Detailed program

1. Introduction and definition of the problem: the Big Data Challenge
2. The role of uncertainty: Cause, prediction and unsupervised classification.
3. Causal mechanisms: fundamental elements and a case study.
4. Prediction: the challenge of assessing uncertainty in predictive models.
5. Unsupervised learning: Self-Organizing-Map and marketing
6. Bonus track: the analysis of drift in business models.
7. Reporting of company results: creating a narrative around the model

## **Prerequisites**

Principles of programming in R or Python. Basic statistics.

## **Teaching methods**

The 21-hour course consists of:

- 11 hours of remote synchronous laboratory sessions.
- 10 hours of in-person lecturing sessions.

## **Assessment methods**

Project and written exam about the course content (50%-50%) . The assessment depends on the correctness and the clarity of the answers.

## **Textbooks and Reading Materials**

The reading material is based on journal articles and selected book chapters. The material will be available on the e-learning platform.

Book

Data Science for Business  
What You Need to Know about Data Mining and Data-Analytic Thinking  
By Foster Provost, Tom Fawcett

## **Semester**

II semester

## **Teaching language**

English

## **Sustainable Development Goals**

INDUSTRY, INNOVATION AND INFRASTRUCTURE

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