



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## SYLLABUS DEL CORSO

### Economics for Data Science M

2223-2-F8204B020

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#### Learning objectives

The ubiquity of large amounts of data and the contextual developments in computational capacity and algorithms create new opportunities in the economic and corporate spheres. 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.

At the end of the course the student will be able to transform an economic and business problem into a model, choose which empirical approach is the most correct and present the results of the analysis in a professional way.

#### Contents

The course is divided into 5 parts.

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

The fifth part focuses on how to generate the reports for the various types of analysis in the economic-business context with particular attention to the creation of the narrative accompanying the different models and their visualization.

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

## **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 models: fundamental elements and a case study.
4. Causal Models: case studies and laboratory
5. Prediction: the challenge of assessing uncertainty in predictive models.
6. Prediction: case studies and R lab
7. Unsupervised learning
8. Unsupervised learning: case studies and R lab
9. Hot topic I: network analysis for business.
10. Network analysis for business: case studies for HR and marketing
11. Hot topic II: the challenge of unstructured data.
12. Unstructured data: case studies with textual data.
13. From data to knowledge: the data reporting process in economics and business.
14. From data to knowledge: basic principles of data visualization.

## **Prerequisites**

Principles of applied econometrics and statistical quantitative methods for data analysis.

## **Teaching methods**

Lectures, debates, presentations, computer lab

## **Assessment methods**

Attending students: project and written exam.

Non-attending students: project and written exam.

## **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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