UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

# COURSE SYLLABUS

# Data Science Lab

**2223-1-FDS01Q003**

## Learning objectives

To make students capable to set and lead data science projects on complex data systems.

Particularly, the course focuses on projects addressing soft and "open" questions, where a precise specification of analytical goals lacks, differently from a "classical statistics setting" and where data sources are the basis for new services, whose design and implementation requires creativity, managerial and communicative skills as well as methodological competencies.

In addition, some lessons/workshops will be devoted to algorithms and methodologies for treating some data structures of particular interest in the data science practice (e.g. temporal data or partially ordered data).

## Contents

The course illustrates and introduces to the kind of activities that a data scientist performs in socio-economic and business contexts and the topic of how to manage data science projects. In practice, these topics are addressed by means of concrete projects to be managed by groups of students, with the supervision of the teacher.

## Detailed program

The course is divided into two parts. In the first some lessons, under the form of seminars, will be held to touch upon some specific basic topics, In the second part, students will be assigned projects to be managed and concluded within the course.

PART I

1. The current technological and economic context: complex socio-economic processes, the need for new knowledge and innovative services.

2. Data complexity and new data sources: web, e-commerce, Internet of Things, Smartphones...

3. Data.driven business processes: marketing, crm, operations...

4. Examples of data science projects.

5. Basics of Project Management: specificities and criticalities of data science projects, data quality and technological choices.

6. Computability and the limits of machine learning algorithms.

7. Analysis of temporal data.

8. Analysis of partially ordered data.

PARTE II

Definition and assignment of data science projects to student groups (each group is composed of 3-4 students; the content of the projects will be identified during the course) .

## Prerequisites

There are no formal prerequisites but basic competencies in inferential statistics, data anaysis, data mining and R programming are necessary.

## Teaching methods

Frontal lessons and project supervision.

## Assessment methods

The competence level will be assessed by:

1. An ongoing evaluation of the way students face the management of the project and its difficulties.

2. Assessment of the project report, by the teachers, in terms of orginiality, methodological soundness and quality of the exposition.

This assessment method is motivated by the goal to put students into the setting of real business activities and to make their soft skills (e.g. organizational, communicative) and creativity emerge.

## Textbooks and Reading Materials

Computers Ltd. What they really can't do, Harel D. Oxford University Press, 2000

Documents and slides provided by the teacher, available online

## Semester

II semester

## Teaching language

Italian

## Sustainable Development Goals