



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## COURSE SYLLABUS

### Social Media Analytics

2223-2-F9101Q021

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#### Aims

The course aims to provide students with the main concepts behind the management of data originated in social media (access, pre-processing, modeling) and their subsequent analysis. Students will be able, in particular, to collect, process and analyze data from major social media, using the most suitable technologies for the purpose. They will also be able to provide a representation of complex social structures in order to extract useful information from them.

#### Contents

1. The Social Web: introduction and related terminology;
2. Retrieving data in social media.
3. Representing complex social data structures (graph theory and networks);
4. Description of some open issues (information diffusion and veracity);
5. Social Network Analysis;
6. Subjectivity and sentiment analysis, irony detection;
7. Named Entity Recognition and Linking;
8. Visualization of social media data: open issues and techniques.

#### Detailed program

##### PART I

##### 1. Introduction

- The Social Web: introduction and related terminology: Social Web, Social Networks, Social Media, User-Generated Content (UGC).
- Different classes of social “information objects”: 1) texts: posts, blogs, microblogs, 2) images, 3) audios, 4) videos.
- Social Media Analytics: definition and objectives. The concepts of auto-presentation and auto-disclosure.

## **2. Retrieving data in social media**

- Main social platforms, Advanced Programming Interfaces (API)s, the “crawling” process.
- Pre-processing and storing of social data.
- Outline of legal issues related to data collection (the GDPR).

## **3. The social data representation issue**

- Elementary and complex data structures.
- Representing social structures via a graph-based representation (graph theory, networks, network analysis: link analysis, web link analysis, centrality measures).

## **4. Description of some open issues**

- Information tracking over time.
- Information credibility of online information.

## **PART II**

### **5. Social Network Analysis**

- Network clustering: community-detection algorithms.
- Influence and contagion in social media.

### **6. Subjectivity and Sentiment Analysis, Emotions and Irony detection**

- Lexicons.
- Supervised e semi-supervised models.
- Natural language processing techniques.

### **7. Named-entity Recognition and Linking**

- Probabilistic graphical models for named entity recognition.
- Linking methods: learning vs retrieval.
- Word Sense Disambiguation.

### **8. Visualization of social media data: open issues and techniques**

## **Prerequisites**

Basic knowledge of the principles of linear algebra, statistics, programming.

## **Teaching form**

- Lectures
- Laboratory exercises
- The course will be held in English

## **Textbook and teaching resource**

- Rahman, Md Saidur. Basic graph theory. Springer, 2017.
- Reinhard Diestel. Graph Theory. Springer, 2017.
- Suliman Hawamdeh, Hsia-Ching Chang. Analytics and Knowledge Management. CRC Press. 2018.
- John Scott. Social Network Analysis. Sage, 2012.
- Bing Liu. Sentiment Analysis and Opinion Mining. Morgan & Claypool. 2016.
- Eneko Agirre, Philip Edmonds. Word Sense Disambiguation: Algorithms and Applications (Text, Speech and Language Technology). Springer. 2007.

## **Semester**

First semester

## **Assessment method**

**Written exam** with exercises and open questions.

The written test aims at the extensive and intensive evaluation of the theoretical and theoretical-practical skills acquired during the course.

**Group project** (with oral presentation).

The project aims to assess students' ability to translate the skills acquired during the course into real application fields, through the development and use of technological solutions for analyzing social media data.

- The written exam is assessed on a scale from 0 to 24.
- Students must obtain a grade of 12 or more in the written exam.
- The project, with relative oral discussion, is evaluated on a scale from 0 to 9.

The final grade will be given by the sum of the evaluation obtained in the written exam and by the evaluation related to the project.

## **Office hours**

By appointment:

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## Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | GENDER EQUALITY | REDUCED INEQUALITIES

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