UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Ict and Business Modeling

2526-3-E3101Q131

Aims

The course aims to provide the student with professional knowledge and skills regarding:

- understanding of core business functions, interpretation of financial documents, fundamentals of marketing analytics, and machine learning and data modeling techniques applied to business;
- management of AI projects, including the analysis of specific business problems;
- analysis, design, implementation, and validation of AI applications in Python, covering Supervised and Unsupervised Learning, Recommender Systems, Deep Learning and Neural Networks, Large Language Models (LLMs), and Generative AI;
- development of critical thinking skills in selecting analytical methods, interpreting results, and evaluating the effectiveness of developed models.

Contents

The course is divided into four modules:

1. Organization and business management
2. Data analysis techniques, machine learning, deep learning, and LLMs applied to marketing
3. Recommender systems
4. Exercises and laboratory: implementation of applications in Python on specific problems

Detailed program

1 . * Organization and business management *

• Elements of economics and business organization
• How to read the financial statements of a company
• Elements of corporate finance

2. ***Data analysis and machine learning techniques applied to marketing***
   • Product / Consumer analytics
   • Key Performance Indicators (KPIs)
   • Data processing: introduction to the main machine learning techniques for marketing data analysis (eg regression, classification, clustering

3. ***Recommender systems***
   • The main types of recommender systems: collaborative based and content based
   • Rating matrix and sparsity problems
   • Main algorithms: KNN, matrix factorization
   • Optimization elements for recommender systems

4. ***Esercitazioni e laboratorio***

4.1 Analysis of specific problems in the marketing field

• Presentation and discussion of specific cases of marketing problems
• Preparation and visualization of the data: Business Intelligence (BI) and Data Modeling in the company environment

4.2 Laboratorio: ***sviluppo di applicativi in Python***
• Introduction to Python
• Exploratory / descriptive analysis of datasets related to marketing problems
• Application development of machine learning in Python

Prerequisites

Teaching form

The training activity will be divided into:

- *lectures* : in which the topics related to points 1,2 and 3 will be presented.
- *exercises and laboratorie*s : in which the topics of marketing data analytics will be explored with development in Python of specific applications with real data. These activities will be preparatory to the setting up and development of the project which will consist in the creation of a recommendation system. (recommender systems).
  The course will be delivered in *Italian language* *

Textbook and teaching resource

During the lessons the following didactic material will be made available:

- Slides created by the teachers

- Additional material eg. links to news, forums, specific web resources on the topics covered in class

Semester

Second semester

Assessment method

- ***Traditional***: oral exam at the end of the course that focuses on the topics covered in class by the two teachers. The oral exam regarding the topics of points 1,2 and 3 will not be required for students who have passed the intermediate test.
- ***Intermediate Check***: (mid-December): the test consists of a test with a set of questions (maximum 10) with open answers regarding the topics presented in points 1, 2 and 3 . Each question will be associated with a score, from 3 to 5. The student can answer any number of questions. The evaluation of the partial will be expressed through a quali-quantitative judgment: Insufficient [<18], Sufficient [18-> 22], Good [23-> 26], Excellent [27-> 30], Top [> 30]

Laboratory Project in Python:

The project is divided into:

- Implementation of an application in Python for the analysis of marketing data
- Report
- Oral discussion of the project using a set of slides

Delivery times will be communicated on Moodle

Office hours

The two instructors are available for meet students or immediately after the lectures or setting up a meeting anytime in office hours by email.

Sustainable Development Goals

INDUSTRY, INNOVATION AND INFRASTRUCTURE