UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Business Intelligence For Financial Services

2021-3-E3101Q117

Aims

Training participants to be able to professionally use and/or implement business intelligence/analytics and data science applications with particular emphasis on management and analysis of fdinancial data, both batch and online.

More precisley, the course will provide competences for the development of solutions aimed at supporting financial market analysis.

Contents

- Financial markets: organization, micro-structures and technologies (e.g. bitcoin and block-chain)
- Financial markets as "data generators"
- Asset allocation and Capital Asset Pricing Model
- Pricing of derivatives
- High Frequency Trading (HFT): arbitrage techniques
- Computational finance through R
- Pythn for finance: an introduction
- Design of applications for Predictive analytics and Algorithmic Trading

Detailed program

- Intro to the course and the data sources

- Actual Value and returns

- Risks of financial activities, utility functions

- Finacial markets and financial instruments

- Correlation, covariance, mean-variance, Capital Asset Pricing Model (CAPM)

- Bonds, debt securities, stocks

- Derivatives

- Introduction to R

- Data download and analysis (with R)

- Representing and Handling financial data with R

- Asset & Portfolio management

- Statistics of Financial Time Series Data

- Similarity measures and Clustering of financial time series data

- Forecasting

- Introduction to Python: statistical and predictive analysis on financial data

Prerequisites

- Data Bases;

- Statistics;

- Software programming

Teaching form

The training will consist of lectures, tutorials that will present the details of computational methods needed for the development of a project and support activites in laboratory.

The course is taught in Italian.

Textbook and teaching resource

- Slides provided by the teachers

- Papers suggested during the course

- Book: "Computational Finance - An Introductory Course with R", Argimiro Arratia, Atlantis Press (2014)

Semester

Bachelor degree - third year - first period

Assessment method

The exam will be organized as follows:

1) An intermediate test, around mid of December, consisting of a set of questions (max 10), requiring an "open-answer" and related to the topics of the course

Every question is associated to a score, 3 to 5. The student can reply to all or part of the questions.

Some examples of questions:

- [5 POINTS] Capital asset pricing model
- [5 POINTS] how are the attitudes to risk represented by the utility functions?
- [3 POINTS] Average return rate

Evaluation of the intermediate test will be reported through a quali-quantitative rating:

- Not sufficient [<18]
- Sufficient [18->22]
- Good [23->26]
- Excellent [27->29]
- Top [>30]

The intermediate test is NOT mandatory: a rating at least sufficient allows the student to avoid questions on the same topics at the final exam.

2) The final exam will be organized as follows:

- **Oral examination:**
  On topics presented during lessons by teachers.
    - Topics of the intermidiate test will not be part of the oral examination for students who pass the test.

- **Project**:
  Development of an application, in R, for the analysis of financial data. In addition to a report, the project will be discussed , through a set of slides.
  Deadlines for submitting the project will be indicated on Moodle.

During the Covid-19 emergency period, oral examanimations will take place remotely through the WebEx platform. On the e-learning page of the course there will be a public link for accessing to the examination of possible virtual spectators

Office hours

Tuesday 10:00-12:00