SYLLABUS DEL CORSO

Economics for Data Science M

2425-2-F8204B020

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.

In general, the educational objectives fall within the areas of economic statistics and econometrics related to businesses.

Contents

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The course is divided into 5 parts.
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The first part discusses the role of big data within 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

The course consists of 42 hours:

12 hours of remote synchronous laboratory sessions.

12 hours of in-person interactive sessions (student presenations and debates).
18 hours of in-person lecturing sessions.

Assessment methods

Attending students: project and written exam.

Non-attending students: project and written exam.

The assessment depends on the correctness and the clarity of the answers.

The written exam consists of 4 open-ended questions. The project involves answering a question on economics or business based on a dataset provided by the teacher.
Concerning the evaluation, the correctness and clarity of the answers will be assessed, aiming to evaluate the skills described in the learning objectives.

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