Data & Analytics speciality

ECTS credits
8 credits

Semester
Fall

In brief

Course langage: French

Presentation

Prerequisites

The "Data and decision" unit of DDEFi and its own prerequisites

Learning objectives

* Know how to use data in a strategic approach
* Know how to present a model, its results and its insights
* Know how to assess data suitability to a specific issue
* Know how to combine model and data to take pricing decisions
* Understand the importance of methodological choices when building indexes and indicators

Description of the programme

This unit is composed of three courses (of 24 hours each): **Quantitative marketing**, **Data and macroeconomics**, **Applied data science**; and is complemented by the second part of the data project (9 hours course and 12 hours project) devoted to models and their validation.

Quantitative marketing

1. Data processing
   i. Data: a matter of representation
   ii. Data in business
   iii. From segmentation to dynamic targeting

2. Marketing from a Data Scientist point of view
   i. Context: the data world
   ii. Scoring
   iii. Statistics
   iv. Correlations
   v. Automatic learning
   vi. Supervised classification
   vii. Perspectives

Data and public policies

This course aims at giving a broad view of macroeconomic data. It is structured around three questions:

1. Can we measure everything?
2. Can we sum everything?
3. Can we compare everything?

These questions will allow to tackle multiple sources for macroeconomic data, their methodology, their limits, and to discuss their common applications. At the end of the course, students should have acquired enough hindsight to use pertinent macroeconomic data to answer a practical question.

Applied data science

1. Introduction to prescriptive analytics
2. Interpretability and maching learning
3. Application to revenue management
4. Application to predictive maintenance

Data science projects. Part 3: Models and validation

1. Projects and models
   i. The Bias-Variance tradeoff
   ii. Feature Selection
   iii. Feature Engineering
   iv. Defining a metric
2. Models and applications
   i. Regressions (linear, polynomial, penalized et logistic)
   ii. Decision trees (random forest and gradient boosting)
3. Focus on Natural Language Processing (NLP)

Generic central skills and knowledge targeted in the discipline

* Know how how data and models can be used in business cases ranging from marketing to transportation

* Know how public statistics are build and use

How knowledge is tested

* Group project and presentation (Quantitative marketing): 25%
* Project (Data and macroeconomics): 25%
* Project (Applied data science): 25%
* Group project and presentation (Data science projects): 25%

Bibliography

Quantitative marketing

* Abiteboul, S., « Sciences des données : de la logique du premier ordre à la Toile », Leçon inaugurale du Collège de France

Data and macroeconomics

* https://ec.europa.eu/eurostat/data/database
* https://datagora.fr/

Applied data science

* Carter, M., Price, C. and Rabadi, G. "Operations Research: A Practical Introduction", Advances in Applied Mathematics

Data science projects

* Zeng, A and Casari, A. Feature Engineering for Machine Learning. O'Reilly Media.
* Müller, A. and Guido, S. Introduction to Machine Learning with Python. O'Reilly Media.

Teaching team

* Quantitative Marketing: Vincent Archer (Locala), Thibault Camper (Locala)
* Data and macroeconomics: Aurélien Poissonnier (Ministère de l'Intérieur)
* Applied data science: Julien Bruno (Air France), Nathan Rouff (Ekimetrics), Teresa Pi Torras (Air France)
* Data science projects: Alexandre Chirié et Maxilimilen Défourné (Mantiks)

Sustainable Development Goal

Data & Analytics speciality

Partnerships for the goals

Reduced inequalities

Sustainable cities and communities

Total des heures		**100h**
CM	Master class	80h
PJ		20h