Course unit: Data and Decisions

Course metadata

- Title in French: Données et Décisions
- Course code: tba
- ECTS credits: 4
- Type: advanced course
- Semester 9 (Fall-Winter)
- Teaching period: Mid-November to Mid-February
- Teaching hours: 100h
- Language of instruction: French
- Coordinator: tba
- Instructor(s): Marie Billaud-Friess, Michaël Chalamel (L'Oréal), Franck Chevalier (EY), Emmanuel Daucé, Christophe Pouet, , Sitraka Forler (Post Luxembourg), Lirone Samoun (smartpush)
- *Last update 02/09/2025 by C. Pouet*

Brief description

This course unit is divided into four parts:

- **Statistical learning** (30 hours) taught by Christophe Pouet.
- **Python for data science** (18 hours) taught by François Brucker and Emmanuel Daucé.
- **Advising using data** (24 hours) taught by Michaël Chalamel and Franck Chevalier.
- **Data Project: data sources and preprocessing** (24 hours) taught by Sitraka Forler and Lirone Samoun.

Learning outcomes

- Know how to model and program an estimation problem
- Know how to model and program a classification problem
- Know how to acquire and aggregate data
- Know how to use data to take decisions
- Understand the importance of data governance and data quality

Course content

Statistical learning

1. Introduction
    1. Classical problems: regression, classification
    2. Supervised, unsupervised and semi-supervised learning
    3. Curse of dimensionality
2. Regression
    1. Multiple linear regression, OLS method
    2. Shrinkage-type methods (LASSO, Ridge)

    3. k-nearest neighbors
3. Classification
    1. Logistic regression
    2. k-nearest neighbors
    3. SVM
    4. Rosenblatt perceptron and neuronal networks

Python for data science

1. Dataframe: data exploration and data description
2. Recommendation systems (including KNN, PCA and SVD)
3. Data visualization (including maps, geopandas, …)

Data-driven decision making

1. What is data?
2. How do we take decision?
3. Data governance and data quality
4. How to develop data-based decision making?
5. Data platform and data architecture

Data Project: data sources and preprocessing

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Bibliography

You can check the availability of the books below at Centrale Méditerranée library.

1. Statistical Learning
    - James G., Witten D., Hastie T. and al. (2013). An introduction to statistical learning: with applications in R. New York: Springer
    - Hastie T., Tibshirani R. and Friedman J. (2013). The elements of statistical learning: data mining, inference, and prediction. New York: Springer.
    - Cornillon P-A., Matzner-Løber E. et al. (2010). Régression avec R. Paris: Springer.
2. Python for data science
    - Jannach, D., Zanker, M., Felfernig, A. and Friedrich, G. (2010). Recommender Systems: An Introduction. Cambridge.
3. Advising using data
    - tba