Specialized Master in data science, Big data

The 2024-2025 programme is subject to change. It is provided for information purposes only.

Programme mnemonic
MS-BGDA

Studies level
Advanced master

Learning language
english

Schedule
office hours

Studies category / subcategory
Sciences and technics / Sciences

Campus
Plaine and Solbosch

Programme objectives

You have already a master degree and good knowledges in computer sciences or in statistics and you are interested by their applications. Then the present master is a natural choice to improve your skills and become a specialist in massive data analysis. The program we propose here is fully taught in english and therefore opens to the international job market.

In particular, the objective of the master is to improve the following skills:

1) Perform a research project or an applied innovation in computer sciences or in statistics.

2) Design and implement applications based on artificial intelligence and learning techniques.

3) Clearly communicate to various types of audiences conclusions or results of a project in computer sciences, statistics or econometrics.

4) Be able to develop new skills by yourself.

5) Be able to be rigorous, independent, ethic, creative and aware of the impact of the results obtained for a company or for the society in general.

Teaching methods

The specialized master in data science, big data provides an interdisciplinary training in data analysis (model choice, forecast, inference, learning) of big data. The program has been constructed in order to teach both statistical and computer sciences techniques. We furthermore propose lectures in econometrics to let students deal with quantitative practical aspects. The student who wants to complete his/her master by a internship will clearly benefit form the fact that Brussels is full of companies interested by the profile.

Several faculties are involved in the master: the Faculty of Sciences, the Brussels School of Engineering and the Solvay Brussels School of Economics and Management from ULB and also partners for the VUB. This is clearly an asset since it reinforces the interdisciplinary aspect of the master which is supported by various important teams of researchers from the ULB and the VUB:

ECARES, Solvay Brussels School of Economics and Management.

IB2 (Interuniversity Institute of Bioinformatics in Brussels), ULB/ VUB.

IRIDIA, Brussels School of Engineering.

LISA, Brussels School of Engineering.

Machine Learning Group, Faculty of Sciences.

Mathematical Statistics Group, Faculty of Sciences.

WIT, Brussels School of Engineering.

Job opportunities

The present master has been created to deepen your knowledge and understanding of emerging, state-of-the-art database technologies. Indeed, the intensive use of computers and the internet in the beginning of the present century has a clear

impact on the way data have to be collected and treated. In many situations, practitioners have to deal with massive databases (« Big data »).

Data science finds its roots in many applications: genomics and high scale DNA sequencing generate tons of data at many different biological levels; the use of social networks, mobile phones, tablets generate data every single second; robots and industrial equipments are nowadays equipped with sensors that provide a huge amount of information and therefore huge databases. In economics and in finance, practitioners have to deal with real-time forecasts based on high-frequency data (production, trade, market data).

The master is a natural preparation for the following jobs: ``data scientist'', ``data manager », ``analytics manager » or simply ``statistician » or ``computer scientist » that are increasingly demanded by companies.

For further informations concerning the potential jobs related to the program, you can consult the following page: https://www.sfds.asso.fr/default.php?p=470

Contacts

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Unique year | MS-BGDA

Cours obligatoires

INFO-H600   **Computing Foundations of Data Sciences** | Dimitrios SACHARIDIS (Coordinator)
🕐 5 credits [lecture: 24h, tutorial classes: 12h, practical work: 12h]   📅 first term   💬 English

MEMO-F541   **Mémoire/ Stage en entreprise** | Thomas VERDEBOUT (Coordinator)
🕐 20 credits [mfe/tfe: 240h]   📅 academic year

STAT-F600   **Multivariate and high-dimensional statistics** | Thomas VERDEBOUT (Coordinator)
🕐 5 credits [lecture: 24h, practical work: 12h]   📅 first term   💬 English

STAT-S502   **Data management and analytics** | Pierre DEVILLE (Coordinator)
🕐 5 credits [lecture: 36h, tutorial classes: 24h]   📅 second term   💬 English

Module 1 : Statistique

Two courses chosen from the following

INFO-F422
(optional)   **Statistical foundations of machine learning** | Gianluca BONTEMPI (Coordinator)
🕐 5 credits [lecture: 24h, tutorial classes: 12h, project: 60h]   📅 second term   💬 English

STAT-F405
(optional)   **Time series analysis** | Yves-Caoimhin SWAN (Coordinator)
🕐 5 credits [lecture: 24h, tutorial classes: 12h]   📅 first term   💬 English

STAT-F408
(optional)   **Computational statistics** | Maarten JANSEN (Coordinator)
🕐 5 credits [lecture: 24h, tutorial classes: 12h, project: 100h]   📅 second term   💬 English

STAT-F420
(optional)   **Topics in mathematical statistics** | Thomas VERDEBOUT (Coordinator)
🕐 5 credits [lecture: 24h, tutorial classes: 12h]   📅 first term   💬 English

STAT-F421
(optional)   **Topics in probability theory** | Yves-Caoimhin SWAN (Coordinator)
🕐 5 credits [lecture: 24h, tutorial classes: 12h]   📅 second term   💬 English
Ce cours n'est pas donné en 2024-2025, 2026-2027 etc.

STAT-F423
(optional)   **Statistical learning**
🕐 5 credits [lecture: 24h, tutorial classes: 12h]   📅 second term   💬 English

Module 2 : Informatique

Two courses chosen from the following

INFO-F424
(optional)   **Combinatorial optimization** | Bernard FORTZ (Coordinator)
🕐 5 credits [lecture: 24h, tutorial classes: 12h, practical work: 12h, project: 30h]   📅 second term   💬 English

INFO-F440
(optional)   **Algorithms for big data** | John IACONO (Coordinator)
🕐 5 credits [lecture: 24h, tutorial classes: 12h, project: 60h]   📅 second term   💬 English

INFO-F524
(optional)

Continuous optimization | Bernard FORTZ (Coordinator)

5 credits [lecture: 24h, project: 60h]   second term   English

INFO-H423
(optional)

Data Mining | Mahmoud SAKR (Coordinator)

5 credits [lecture: 24h, tutorial classes: 12h, practical work: 24h]   first term   English

INFO-H501
(optional)

Pattern recognition and image analysis | Olivier DEBEIR (Coordinator) and Christine DECAESTECKER

5 credits [lecture: 36h, practical work: 24h]   second term   English

INFO-H512
(optional)

Current trends in artificial intelligence | Hugues BERSINI (Coordinator)

5 credits [lecture: 24h, project: 30h]   second term   English

INFO-H515
(optional)

Big Data: Distributed Data Management and Scalable Analytics | Dimitrios SACHARIDIS (Coordinator) and Gianluca BONTEMPI

5 credits [lecture: 24h, tutorial classes: 12h, project: 24h]   second term   English

Module 3 : Econométrie

One course chosen from the following

ECON-S428
(optional)

Graduate econometrics I | Germain VAN BEVER (Coordinator)

5 credits [lecture: 24h]   first term   English

GEST-S503
(optional)

Financial econometrics | Olivier SCAILLET (Coordinator)

5 credits [lecture: 24h, tutorial classes: 12h]   second term   English