Minor "Data Science in Business", 18 EC

Provided by the Jheronimus Academy of Data Science (JADS), a collaboration of Tilburg University and TU/e.

| Start: Autumn 2023 | Location: Tilburg University campus |

Data is everywhere. However, harnessing the power of data to create value is a complex task that requires specialized knowledge and expertise. That's why integrating data science into business and entrepreneurship is crucial for companies looking to gain a competitive edge.

As data becomes increasingly central to decision-making across all industries, the demand for skilled data scientists is rising. Companies are seeking individuals who can turn raw data into actionable insights, and there has never been a better time to pursue a career in this field.

The minor "Data Science in Business" is the perfect stepping stone if you want to explore the field of data science. This comprehensive program takes a deep dive into the essential topics in the world of data science. It is an excellent choice for you if you want to deepen your knowledge of Analytical Methods, Information Systems, and Business Strategy.

The minor addresses the following disciplines needed to create value from data:

Data Mining	Data Analytics	Data Driven Business Development

Learning goals of the minor Data Science in Business

After finishing this minor, you will be able to

- Translate business problems and challenges into algorithms and code in Python.
- Understand how to deal with the different data structures.
- Run and interpret the basic machine learning models, and translate them into business impact on the basis of real-life data challenges.
- Understand how databases work and handle them to store, manipulate, connect multiple data sources, and retrieve data.

The 18 EC "Data Science in Business" (DS in Business) minor consists of the following 3 courses:

- 1. Real-life Machine Learning: a challenge-based course that allows you to engage with datasets from companies and help them get valuable insights from their data.
- 2. Foundations of Databases.
- 3. Data Structures and Algorithm.

Prior knowledge requirement

The minor is open to all bachelor students from TISEM who have completed at least 15 ECTS of mathematics and statistics courses, from which at least 5 EC of math and 5 EC statistics. All the BSc programs of TiSEM fulfill this requirement, except the BSc Entrepreneurship & Business Innovation (E&BI). E&BI students must follow the course Essential Math for Data Science next to the minor during the fall semester. Before the minor starts, E&BI students are strongly recommended to do an online Math course of <u>TU Delft</u> (Calculus I and II) or <u>TU/e</u>

In addition, all students need to have acquired a basic knowledge of Python, since you will be programming in this language during the minor. To be able to join and participate in the course, you need to have Python Programming skills. This Programming prior-knowledge requirement is fulfilled by students in the Economie & Bedrijfseconomie, Economics, and Econometrics & Operations Research BSc programs. For all other students goes: ideally, this requirement should be covered by a dedicated 5-6EC Programming course provided by Tilburg University.

Alternative via Datacamp:

- <u>Python Fundamentals</u>, 15h
- <u>Python Programming</u>, 24h
- Importing & Cleaning Data with Python, 13h
- <u>Python Toolbox</u>, 16h

Completing the Datacamp modules gives a first impression of whether the minor could be something for you; after completing a module, you receive a certificate that you can add to your CV or Linkedin. Datacamp is free for students from TilburgU via this <u>link</u>.

Alternative via Coursera (courses by the University of Michigan):

- V The basic course "<u>Programming for Everybody (Getting Started with Python</u>)"
- ✓ Plus four specializations called:
- 1. Python Data Structures.
- 2. Using Python to Access Web Data.
- 3. Using Databases with Python.
- 4. Capstone: Retrieving, Processing, and Visualizing Data with Python Total workload: 3 x 19 + 15 + 9 = 81 hours

Coursera provides a 7-day Free Trial and costs €44 per month to continue learning after the trial ends. You determine your own pace of learning and get a certificate upon completion.

Content of the courses in the minor Data Science in Business

1. Real-life machine learning

After finishing this course, you will be able to:

- a. Define Machine Learning from both a theoretical and a business perspective.
- b. Summarize and explain the similarities and differences between classification, regression, dimensionality reduction, and clustering.
- c. Apply and contrast at least three common Machine Learning techniques to a real-life challenge provided by an external organization.
- d. Interpret the performance obtained by a Machine Learning model and report the data-driven insights back to the external organization.

2. Foundations of Databases

After finishing this course, you will be able to:

- a. Program in SQL to store, manipulate, connect multiple data sources and retrieve data.
- b. Understand how relational databases work and how data pipelines function.
- c. Manipulate databases to store, manipulate, and retrieve data.
- d. Connect multiple data sources needed for the data analysis.

3. Data Structures and Algorithms

After finishing this course, you will have knowledge and understanding of the following:

- a. Data structures (list, arrays, dictionaries, sets, etc...).
- b. How to translate a problem to an algorithm.
- c. How to implement algorithms in Python.
- d. Data structures used in Data Science (tensors, dataframes, ...).
- e. How to implement and apply well-known data science-related algorithms (k-Means, Decision Tree, ...).

The course codes linking to OSIRIS are available <u>here</u>. This page will be updated.

JADS and the master Data Science in Business and Entrepreneurship (DSBE)

When you finish the minor "Data Science in Business" you will be directly eligible for the master Data Science in Business and Entrepreneurship at the Jheronimus Academy of Data Science (JADS). JADS is, a one-of-a-kind collaboration between Tilburg University and Eindhoven University of Technology (TU/e). It is a unique educational institution located in 's-Hertogenbosch.

The master's program at JADS is designed to equip you with the knowledge and skills you need to become a successful data science professional with excellent business insights.

You'll learn how to leverage data science to drive innovation and create sustainable value for businesses of all kinds. You'll gain a deep understanding of the latest tools and techniques used in the field and learn how to apply them in real-world scenarios. By the time you graduate, you'll be well-equipped to embark on a successful career in this exciting and rapidly growing field. It combines all the disciplines needed to get from data to business or societal impact, in a responsible way:



PHILOSOPHY OF THE MSc "Data Science in Business & Entrepreneurship"

The program features data science in almost all the courses and represents a combination of evidence- based and challenge-based learning. After all, the best theory is a practical one. Eindhoven University of Technology and Tilburg University jointly run a 2-year master's program (120 EC). The program is located in Den Bosch, on the second campus for both universities. JADS students can do up to 72 ECTS courses with real-life assignments from various companies and organizations, a truly unique experience in the Netherlands and Europe! The program has been evaluated as the best among 26 data science, AI, and business analytics masters in the Netherlands (NSE, 2022).

Go to our <u>website</u> for more info on the Master Program. Watch <u>this</u> about JADS.

Admission requirements for the Master Data Science in Business and Entrepreneurship

BSc program at TiSEM/TilburgU	Required for admission to MSc. Data Science in Business and Entrepreneurship*	
Economics	Minor DS in Business courses (18EC)	
Economie & Bedrijfseconomie	Minor DS in Business courses (18EC)	
Bedrijfseconomie	Minor DS in Business courses (18EC) + 6ECTS additional math/statistics course**	
International Business Administration	Minor DS in Business courses (18EC) + 6ECTS additional math/statistics course**	
Fiscale Economie	Minor DS in Business courses (18EC) + 6ECTS additional math/statistics course**	
Entrepreneurship & Business Innovation	Minor DS in Business courses (18EC) + 6ECTS additional math/statistics course** (cohorts before 2021: + 6 ECTS another stats course)	
Econometrics & Operations Research	"Computational aspects" course in restricted electives + "Real-life Machine Learning" course as a free elective	

To be admitted to the master DSBE, you need to have completed the following courses:

* - admission without the Databases course is possible via the homologation route

** - The suggested math/statistics course is: "Essential Math for Data Science" (the exact name and the course code will become available later, the course will launch in 2023/2024).

Want to know more?

Send your questions to <u>questions@jads.nl</u>