# Data Science, Math & Technology

Course guide 2025-2026

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| Semester | Fall (semester 1) |
| Inholland location(s) | Amsterdam |
| Inholland faculty | Engineering, Design & Computing |
| Language of instruction | English |
| Cycle | Bachelor level |
| Number of ECTS | 30 |

**Please note: the information in this document is subject to change. For more information, please contact the International Coordinator of this program Samia El Abodi at samia.elabodi@inholland.nl**

## Subjects

| Subject title | ECTS | Course code |
|---|---|---|
| Machine Learning | 6 | 3719MACHLA |
| Data Engineering and Cloud Computing | 5 | 3719DECLCA |
| Professional Skills: Data Science Ethics | 3 | 3719PS6DSA |
| Geographic Information Systems | 4 | 3719GEOISA |
| Natural Language Processing | 4 | 3719NLNGPA |
| Project Data Science | 5 | 3719PRDSCA |
| Learning Challenge | 1 | 3718IT412A |
| Research: literature review | 2 | 3711IT422A |

## Content subjects

**Term 1: Data Science Building Blocks**
The first half of the semester covers the fundamental techniques. The Machine Learning course gives students a solid foundation of all aspects of machine learning, including preprocessing, regression, dimension reduction methods, decision trees, clustering methods, Neural Networks and Bayesian models. Working with Big Data involves applying complex algorithms to large data sets.

The course Data Engineering and Cloud Computing focusses on storing and processing large and complex data sets that do not fit on a single machine. Students learn to work with NoSQL databases and to distribute data and computation by means of cloud solutions. Whenever we deal we privacy sensitive data, ethical issues arise.

The course Professional Skills: Data Science Ethics discusses ethical and legal aspects of data science, so that students become aware of their responsibilities as a data scientist.

**Term 2: Applications of Data Science**
The second half of the semester of the minor focusses on applications of Data Science for real-world problems. The term includes courses on handling location data (Geographical Information Systems) and text data (Natural Language Processing).

During the Learning Challenge, students can dive deeper into a data science topic of their own choice. The minor is completed with Project Data Science: in this group project, students work in an interdisciplinary team on a data science problem for a real company.

## Learning outcomes

After completing the minor the student is able to:

- Train Machine Learning models for real-world tasks
- Use NoSQL databases to store and retrieve unstructured and semi-structured data
- Parallelize algorithms and run them in the cloud
- Use Natural Language Processing to analyze text documents
- Use Geographical Information Systems to analyze geospatial data
- Set-up and conduct literature review

- Identify ethical and legal aspects of data science projects

## Mode of delivery, planned activities and teaching methods

The Data Science Minor at Inholland Amsterdam focusses on the mathematics and techniques of Data Science. The minor addresses both the theory and the practical application. Students learn not only which techniques to use, but also the inner mathematical workings of these techniques. The practical side of Data Science consists of hands-on lab sessions where students gain experience with technologies such as scikit-learn, MongoDB, Azure, and many others. Everything comes together in an interdisciplinary group project, where students work on a real data science problem for a client company.

## Prerequisites and co-requisites

The minor is open for 3rd and 4th year bachelor students. The following skills are required:

- Python programming
- Basic statistics
- Basic algebra
- Databases/SQL

If you are unsure if the minor fits your skills or ambitions, you can contact the coordinator of the program, Vanessa Fernand: Vanessa.Fernand@inholland.nl.

## Recommended or required reading and/or other learning recourses/tools

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## Assessment methods and criteria

The minor is assessed by a mix of exams, assignments, and an interdisciplinary group project.

## Lecturer(s)

Vera Hollink – Vera.Hollink@inholland.nl