inholland
university of applied sciences

Data Science, Math & Technology

Course guide 2024-2025

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

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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