Master's Program in Data Science

Self-Study on Missing Requirements

You have been admitted to the Master's program in Data Science. Congratulations!

This program is built on important requirements from the fields of Mathematics and Computer Science. Depending on the field of your Bachelor's degree, you fulfill most of them, or all of them.

You are expected to be familiar with these topics before commencing your graduate studies. This document gives a few pointers to help you close any gaps

You are not expected to read all the books mentioned here, nor to attend any of the mentioned Bachelor lectures. Typically, you should look at the list of topics, check whether you may have knowledge gaps for one or two of them, and make yourself more familiar with them.

Previous editions of ETH lectures often still have their homepage online, with the lecture material available with your nethz credentials. Some have been recorded.

Many books are available in the ETH main library (books must be ordered online first and picked up at the desk on the H floor of the HG building) or the Computer Science library (CAB building).

Mathematics

Analysis

Bachelor's lectures (in German)

401-1261-07L	Analysis I
401-1262-07L	Analysis II

Books

S. Abbot. *Understanding Analysis.*
R.G. Bartle. *The Elements of Real Analysis.*
W. Rudin. *Principles of Mathematical Analysis.*

Linear Algebra

Bachelor's lectures (in German)

401-1151-00L	Lineare Algebra I
401-1152-02L	Lineare Algebra II

Books

S. Axler. *Linear Algebra Done Right.*
S. Lang. *Linear Algebra.*
G. Strang. *Linear Algebra and its Applications.*

Numerical Methods

Bachelor's lectures (in German)

401-0663-00L   Numerical Methods for CSE

Books

U. M. Ascher, C. Greif. *A First Course in Numerical Methods*. SIAM 2011.

Probability and Statistics

Bachelor's lectures (in German)

401-2604-00L   Probability and Statistics

Books

John A. Rice. *Mathematical Statistics and Data Analysis*. Chapters 1-11 and Chapter 14.
M. DeGroot, M. Schervish. *Probability and statistics*.

Computer Science

Algorithms and data structures

Bachelor's lectures (in German)

252-0026-00L   Algorithmen und Datenstrukturen

Books

T. H. Cormen, C. E. Leiserson, R. Rivest. *Introduction to Algorithms*. Third Edition (International Edition). 2009.

Databases and data modelling

Bachelor's lectures (in German)

252-0063-00L   Data Modelling and Databases

Books

H. Garcia-Molina, J. Widom, J. D. Ullman. *Database Systems: The Complete Book*.

Programming

252-0027-00L   Einführung in die Programmierung

Books

B. Meyer. *Object-Oriented Software Construction*.
B. Stroustrup. *The C++ Programming Language*.
B. J. Evans, D. Flanagan. *Java in a Nutshell*. O'Reilly.

Data analysis and management

Bachelor's lectures

252-0220-00L   Introduction to Machine Learning

Books

M. Vetterli, J. Kovacevic, V. K. Goyal. *Foundations of Signal Processing*
(recommended for Mathematics of Information)