Degree Program in Brief

The Integrative Study Program offers two different master courses. Students who want to focus on the mathematical aspects are encouraged to apply for “Mathematics in Data Science” whereas students who are interested in the computer science perspective should apply for “Data Engineering and Analytics”.

Duration of Study/Credits
4 semesters/120 credits, full-time

Degree Type
Master of Science (M.Sc.)

Start of Course
Summer/Winter semester

Language
English

Admission Requirements
Graduates with a bachelor’s degree in mathematics and selected modules in computer science or with a degree in computer science with selected modules in mathematics as well as students from other disciplines with a strong academic background in mathematics and computer science can be admitted to the programs. All applicants must pass an admission process which might also include an admission interview. A proof of English proficiency is compulsory.

Costs per Semester

Further Information
www.data-master.tum.de

Master of Science

Integrative Study Program in Data Science
Department of Mathematics

Mathematics in Data Science
and
Department of Informatics

Data Engineering and Analytics

Contact

Technical University of Munich
Department of Mathematics
Department of Informatics

Prof. Massimo Fornasier
Prof. Thomas Neumann
Boltzmannstrasse 3, 85748 Garching

General Questions
Student Service Center
Student Advising & Prospective Students Programs
Tel +49 89 289 22737
studium@tum.de

Program specific Questions
PD Dr. Peter Massopust (Mathematics)
Tel: +49 89 289 17488
Timo Kersten (Informatics)
Tel: +49 89 289 17290

For all inquiries please contact
data-master@tum.de
**Objectives**

Data are a key resource in present and future economic developments. Revolutionary insights can be extracted from data by means of exploration, analyses, and engineering, and the world is reacting with impressive impulses and creative ideas. Industry is pushing towards data-guided decisions, while entrepreneurship flourishes with ever new tidbits of knowledge extracted from data.

In this context, the two TUM master’s programs “Mathematics in Data Science” and “Data Engineering and Analytics” create the unique opportunity for an in-depth study of data science and data engineering.

Both programs provide the fundamentals in data engineering and data analysis. Advanced modules in “Mathematics in Data Science” focus on interpretation of data, simulation and prediction of complex phenomena. “Data Engineering and Analytics” specializes on techniques for the engineering of systems that enable the exploration and analysis of vast amounts of data.

**Requirements**

To enjoy the program and to succeed, your interests and qualities should meet the following:

- **Solid affinity to abstract concepts and their practical implementation**
- **Strong desire to apply mathematical concepts to real world problems**
- **Ability to communicate ideas from complex subjects to interdisciplinary teams**

**Degree Program Structure**

Data science and data engineering require skills and knowledge from multiple disciplines. This prompted the Departments of Mathematics and Informatics at TUM to jointly create integrative study programs in data science. Integrative study programs allow the exchange of expertise among departments so that the master’s programs “Mathematics in Data Science” and “Data Engineering and Analytics” can cover a large spectrum of topics.

Lectures on advanced database technology, distributed systems, IT security, machine learning, and scalable programming methods are provided by the Department of Informatics. Statistics, mathematical representation of large and high-dimensional data sets, their dimensionality reduction, and their classification to mine meaningful information, cryptography and optimization are taught by the Department of Mathematics.

The program “Mathematics in Data Science” emphasizes optimization and statistics, adding basic knowledge to the computer science aspects. The program “Data Engineering and Analytics” targets advanced database technology and scalable programming methods.

**Distinctive Features of the Program**

- The Mathematics and Informatics departments at TUM offer top level competences. Both departments jointly operate the data science programs as part of the TUM Data Science initiative and offer one of first programs of this type in Germany and Europe.
- International ties to other universities provide the opportunity for student exchanges and assure the exchange of competences and top-quality lectures.
- Both programs incorporate practical work experiences and case study laboratories offered by European companies to work on real-life problems.

**Career Profile**

The master’s programs “Mathematics in Data Science” or “Data Engineering and Analytics” offer access to many career opportunities: research, consulting, IT security, systems design, and data science in industry.

The respective departments offer Ph.D. positions that are the pathway to a career in research.

Typical job profiles in industry include that of data analyst and data engineer. Data engineers master very large databases and distributed information systems, are responsible for IT security, and applied data analytics for structuring data. Data analysts filter and extract information from large data sets based on statistical and mathematical methods and tailor them towards informed strategic decisions.