Short Profile

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
Master of Science (M.Sc.)

Begin
Summer and winter semester

Language of Instruction
English

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 the appropriate qualifications can be admitted to the programs. All applicants must pass an admission process which may include an admission interview. Proof of English proficiency is compulsory.

Cost per Semester
Please see

More Information can be found at
www.data-master.tum.de

Master of Science

Integrative Study Program in Data Science:

Mathematics in Data Science

and

Department of Informatics

Data Engineering and Analytics

Contact Information

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**Goals**

Data are a key resource in present and future economic developments. Revolutionary insights can be extracted from data by means of exploration, analysis, and engineering, and the world is reacting with impressive impulse 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 the interpretation of data, on simulation and on the prediction of complex phenomena. “Data Engineering and Analytics” specializes in techniques for the engineering of systems that enable the exploration and analysis of vast amounts of data.

**Program Contents**

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 an integrative study program in Data Science. Integrative study programs allow the exchange of expertise amongst 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. The Department of Mathematics offers statistics, cryptography, and optimization, as well as the mathematical representation of large and high-dimensional data sets, their dimensionality reduction, and their classification to mine meaningful information.

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.

**Special Features**

The Mathematics and Informatics departments at TUM offer top level skills. Both departments jointly operate the Data Science programs as part of the TUM Data Science initiative and offer one of the 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.

**Perspectives**

The master’s programs “Mathematics in Data Science” and “Data Engineering and Analytics” offer access to many career opportunities including: 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 data analysts and data engineers. Data engineers master very large databases and distributed information systems and 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.