

Why Technomathematics?

You are interested in technical issues and applications and enjoy dealing with mathematical challenges?

If this description matches your situation, our degree program “Technomathematics” may be just the right choice for you.

At RheinAhrCampus Remagen you can enroll for a very flexible degree program with optional specializations on various topics. The degree program provides an in-depth introduction to central issues in mathematics and information technology. These can be combined with selected highly attractive applications in the areas of

- Medical Engineering
- Imaging and Signal Processing
- Robotics.

Students of Technomathematics complete the same basic modules as students of Biomathematics and Business Mathematics. In addition, they can complete modules from their respective fields of application, such as Medical Imaging, Digital Technology or Robotics. RheinAhrCampus Remagen is equipped with excellent laboratory facilities (CT, MRT, Ultrasound, Robotics,

All Bachelor programs in Mathematics prepare students for our Master program in “Applied Mathematics” (M.Sc.), where students familiarize themselves with advanced mathematical topics like functional analysis, partial differential equations and stochastic analysis. However, after the successful completion of our degree program in Technomathematics, graduates are also well prepared to enroll for our M.Sc. Program in “Applied Physics”.

Contents of courses

In the first few semesters, lectures, exercises and short presentations in analysis, linear algebra and probability/statistics qualify you for self-supporting work in mathematics. Problems in understanding mathematical thinking may arise at entry into university. We reduce them by extended support offers in the first semester.

In numerical mathematics, the newly acquired knowledge is applied to practical problems and solved with computers. As a student of mathematics you become acquainted with several programming languages, e.g. C++, Java and Visual Basic, with professional statistics software and, of course, with office programs.

In addition, lectures in English and physics supplement your mathematical skills, broaden your scope and enhance your professional competence.

During your ongoing studies you deepen your knowledge in analysis, numerical mathematics and statistics and you dig into new mathematical subjects related to the technical applications mentioned above.

Your programming skills are extended and you become acquainted with modern relational and object-oriented data base technologies.

Exercises, seminars and practical work will enable you to successfully solve projects in your favorite areas.

The last semester of your studies offers the opportunity to transfer your knowledge from university to real life by practical training, where you work for a German or foreign enterprise or public institution, in industry, research or business. You may deepen your contact to business in the subsequent Bachelor thesis which should be done in co-operation with an external site. This close relation to professional work opens promising perspectives for your future.

Aims of the course

After your successful studies of Technomathematics, you have learned how to analyze complex structures and how to reduce them to mathematical models (systems of equations) which are simple enough to be manageable – yet accurate enough in order to describe reality.

You know how to implement algorithms in relevant programming languages. You know about modern data base technology and you are able to define data base models for practical problems and to implement them in commercial data base systems.

Faculty of Mathematics and Technology: B.Sc. in Technomathematics

Beyond your knowledge of mathematical techniques, you have gained competences which characterize mathematicians: you understand complex logical interrelations; you are able to translate problems into mathematical terms, to select appropriate methods for their solution and to develop efficient algorithms. Finally, you can solve the problem, usually using a computer, and display the results in a language which is within everybody's grasp.

You have got contacts to business and industry. This opens the possibility to continue working in your special area, or you may decide to rely on your mathematical skills and achieve a new area by work.

Mathematics is valid at all times, not a fashion. Therefore, mathematicians are less dependent on fluctuations in the job market.

Career perspectives

- Product development (imaging devices, equipment for medical engineering, construction of tools/machines for physical/optical applications)
- Development of simulation software
- Development and optimization of digital control systems for car industry and automotive suppliers, environmental engineering, ...
- Running and optimization of networks used by electricity, gas and public transport providers
- Software development
- Telecommunication and Internet
- Corporate consulting

Degree awarded:

Bachelor of Science (B.Sc.)

Admission criteria:

- Advanced Technical College Certificate (*Fachhochschulreife*), general qualification for university entrance (*Abitur*) or recognized international equivalent.
- Students whose native language is not German need to document [their proficiency in German](#). Additional information is provided by the Admissions Office.

Applications can be made for winter and for summer term.

Duration of studies

6 semesters (= 3 years); with practical training and the Bachelor thesis in the last semester.

The practical training can be done in an enterprise or public institution, where students gain experience in professional work and should get ideas for their thesis.

Equipment

There are several PC-pools and UNIX-workstations available for students. All of them have access to the scientific network and to the internet. For work on projects and thesis we will finally have six mathematics laboratories with powerful workstations and software. Online inquiries in literature and in data bases can be done at several workstations in the library.

Additional information

Our internet site supplies additional information about our courses in Technomathematics, Business Mathematics, Biomathematics and on other courses offered at the RheinAhrCampus Remagen. Click "Studienangebot" and then "Technomathematik" and browse through our pages (presently in German only).

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Structure of the Course/Curriculum

1	2	3	4	5	6
7,5 Analysis I	7,5 Analysis II	7,5 Analysis III	7,5 Analysis IV	7,5 Introduction to Optimization and Selected Topics	16 Practical Study Phase
7,5 Linear Algebra I	7,5 Linear Algebra II	7,5 Programming II and Data Base Systems	7,5 Numerical Methods in Linear Algebra	7,5 Numerical Methods in Analysis	
7,5 Programming I	7,5 Probability Theory	7,5 Statistics I	7,5 Statistics II	7,5 Techno Module IV	12 Bachelor Thesis
2,5 Computer Mathematics	7,5 Techno Module I	7,5 Techno Module II	7,5 Techno Module III	7,5 Techno Module V	
5 Languages					2 Bachelor Colloquy

(This curriculum was implemented in Summer Semester 2013.)

Please note that the B.Sc. programs in **Mathematics** are also available for two other areas of specialisation (Business Mathematics, Biomathematics). Please refer to the respective course descriptions for more information.

Successful completion of this B.Sc. degree qualifies a student for acceptance onto a Master's degree course, e.g. our M.Sc. Program in Applied Mathematics. Specific regulations may apply.