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

HOCHSCHULE KOBLENZ
UNIVERSITY OF APPLIED SCIENCES
■ RheinAhrCampus

Why business mathematics?

The new Bachelor program in *Business Mathematics* at RheinAhrCampus Remagen allows the students to delve into a rich spectrum of fascinating and up-to-date mathematical and business oriented topics of high practical relevance. The combination of these mathematical topics with a modern education in applied computer science matches the needs of the industry and lays the foundations for a successful career. As a graduate in applied mathematics who has – in addition to his theoretical knowledge – lots of experience in computer aided problem solving you will find that all doors into professional life are wide open.

In contrast to many subjects that are *en vogue* today, mathematics is timeless. It is also for this reason that our future graduates are not that much subject to fluctuations in the job market.

During your course of studies of Business Mathematics you will not only gain a deeper understanding of insurance and financial mathematics as well as of decision support and applied computer science, but you will also acquire the ability to familiarize yourself quickly with new and complex problems. So you are not restricted to a limited number of professions but you are able to work successfully in a large variety of different areas.

Contents of courses

In the first few semesters, the main focus is on lectures, exercises and short presentations in analysis, linear algebra and probability theory/ statistics; these will enable you to acquire a solid background knowledge of mathematics.
In numerical mathematics, you are going to tackle mathematical problems with the aid of computer programs. As a student of mathematics you become acquainted with modern 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 business administration supplement your mathematical skills, broaden your scope and enhance your professional competence.

During your studies you deepen your knowledge in analysis, numerical analysis and statistics and you dive into new mathematical subjects like differential equations, martingales, brownian motion and discrete stochastic analysis.
You learn these new mathematical concepts hand in hand with their applications in insurance, business and finance.
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 6th and final 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 a 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.

During your successful studies you have familiarized yourself with insurance mathematics and mathematical finance. You know about the different types and how insurance companies calculate their tariffs.

We offer two other mathematical specializations at RheinAhrCampus: Biomathematics and Technomathematics. All of these B.Sc. courses may be continued at graduate level by enrolling for our M.Sc. program in *Applied Mathematics*, where you will familiarize yourself with advanced mathematical topics like functional analysis, partial differential equations and stochastic analysis. This will be used to develop a sound understanding of continuous mathematical finance.

Aims of studies

You know modern mathematical finance and insurance mathematics aside with their significance for business administration.

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Furthermore you are familiar with the concepts and procedures for risk analysis used by banks, insurance and investment companies and investment managers. In addition, you are familiar with the essential optimization procedures which are used in the decision-making process.

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.

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 and less prone to the changes of fashion. Therefore, mathematicians are less severely affected by fluctuations in the job market.

Career Perspectives

As a graduate of Business Mathematics you have access to a variety of different professions. The following list presents a selection of conceivable employers.

- Insurance Companies
- Banks
- Investment Companies, Asset Management Companies
- Audit firms
- Federal Institutes for Banking and Insurance
- Controlling and Risk Management Departments
- Management Consultancies
- Software-Development and Database Programming Companies

Prerequisites for admission

- Advanced Technical College Certificate (*Fachhochschulreife*), general qualification for university entrance (*Abitur*) or recognized international equivalent.
- For non-native speakers of German: Documentation concerning your proficiency in German.

You can begin your studies in winter and summer.

Degrees awarded

- Bachelor of Science (B.Sc.)

Duration of studies

6 semesters, including a practical study phase and a Bachelor Thesis in the final semester.

The practical training can be completed in a company where the students have the opportunity to make their first work experience and get ideas for their Bachelor thesis.

Equipment

The IT Center has lots of Windows PCs and UNIX Workstations. From all computers it is possible to log into scientific networks and into the internet. There are also six mathematics laboratories available with especially powerful workstations. The library offers online research facilities in a variety of scientific databases.

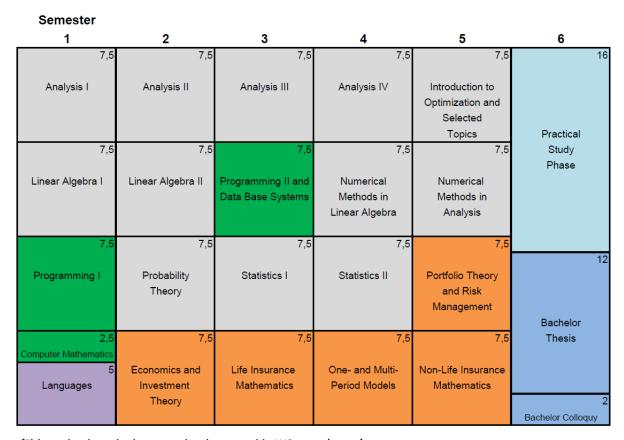## Further information

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Studying in REMAGEN (Koblenz University of Applied Sciences)

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Structure of the Course/Curriculum

Semester

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** Portfolio Theory and Risk Management	**12** Bachelor Thesis
2,5 Computer Mathematics **5** Languages	**7,5** Economics and Investment Theory	**7,5** Life Insurance Mathematics	**7,5** One- and Multi-Period Models	**7,5** Non-Life Insurance Mathematics	**2** Bachelor Colloquy

(This revised curriculum was implemented in WS 2012/2013.)

Please note that the B.Sc. programs in **Mathematics** are also available for two other areas of specialisation (Biomathematics, Technomathematics). 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.