Module Name: Mathematics 1		
Module Code	w.BA.XX.2Mathe1-WIN.XX	
Module Description	Students know, understand, and use the basic mathematical instruments of discrete mathematics and analysis in subject areas like Boolean algebra, combinatorics, sequences, functions and differential calculus. They are able to apply these instruments when describing and analyzing IT and business problems/situations.	
Program and Specialization	Business Information Technology	
Legal Framework	Academic Regulations BSc dated 29.01.2009, Appendix to the Academic Regulations for the degree programs in Business Administration, Business Information Technology, and Business Law, first adopted on 12.05.2009	
Module Category	**Module Type:** Compulsory	**Program Phase:** First-Year Studies
ECTS	3	
Organizational Unit	W Zentrum für Risk & Insurance Ltg.	
Module Coordinator	Johannes Gerd Becker (bece)	
Deputy Module Coordinator	Wolfgang Sickinger (sici)	
Prerequisite Knowledge	Mathematical knowledge at the level of the vocational baccalaureate (commercial or technical); basic knowledge about spreadsheets (such as EXCEL)	
Contribution to Program Learning Goals (Affected by Module)	§ Professional Competence § Methodological Competence § Social Competence § Self-Competence	
Contribution to Program Learning Objectives	Professional Competence § Knowing and Understanding Content of Theoretical and Practical Relevance § Apply, Analyze, and Synthesize Content of Theoretical and Practical Relevance § Evaluate Content of Theoretical and Practical Relevance Methodological Competence § Problem-Solving & Critical Thinking § Scientific Methodology § Work Methods, Techniques, and Procedures § Information Literacy Social Competence § Written Communication § Oral Communication § Teamwork & Conflict Management Self-Competence § Self-Management & Self-Reflection § Learning & Change	
Module Learning Objectives	Students... § are able to explain the structure of different number systems and their significance in the context of information technology § are able to explain the significance of logical statements and conclusions and determine if they are correct § are able to explain logarithms and list and explain examples § are able to define the terms "tuple", "set", and "sequence" and name and explain examples § are able to explain the term "limit of a sequence" § are able to give characteristic examples (in a business context) of logarithmic, linear, polynomial, and exponential growth and explain the significance of these terms in the context of information technology. § are able to define the concept of function. They can explain the influence that this has on traditional and modern concepts of information technology. § are able to explain important features of functions, in particular concavity, convexity, and monotony § are able to explain the significance of reversibility and inverse function § are able to explain and apply the concept of "composite function" § are able to define specific types of functions (linear functions, polynomials, logarithmic functions, exponential functions), visualize them, and recognize them from their diagrams § are able to explain the concept of "approximation" as well as how it is related to the limit of a sequence and to continuity	

	§ are able to explain the concept of derivation and interpret it as approximation and as limit of a sequence (sensitivity) § are able to list and apply the derivation rules. They can interpret the content of the sum, product, and chain rules § are able to explain a cost function, its characteristic processes and features, as well as the concepts of "marginal cost", "optimum operation", and "minimum operation". They can explain the meaning of derivation in an economic context. § are able to read and work with binary and hexadecimal numbers § are able to formulate and reformulate logical conditions § are able to read and write down mathematical statements § are able to apply logarithmic rules § are able to apply the basic principles of elementary combinatorics to suitable problems § are able to name the limits of sequences and describe the characteristics of sequences § are able to execute algebraic reformulations and calculations correctly in connection with the function types discussed in class and interpret the procedure visually § are able to apply the concept of function meaningfully in the context of business and IT examples § are able to derive polynomials § are able to use derivation to estimate and make approximate calculations. They can interpret derivation as sensitivity § are able to evaluate the possibilities and limitations of formal models § are able to use approximation procedures to make estimates and reflect on plausibility § are able to use logically correct arguments to explain formal mathematical solution approaches in a clear and comprehensible manner (in writing as well as verbally) § are able to check and evaluate whether a chosen approach is correct by following different approaches and verifying them against each other § are able to acquire abstract and mathematical contents autonomously using suitable sources § are able to identify and close gaps in their knowledge autonomously
Module Content	§ Number representations: Binary and hexadecimal numbers § Summation notation § Basic principles of Boolean algebra (sentential logic) § Logarithms § Tuples, sets, and sequences § Limit of a sequence § Basic principles of combinatorics: permutations, binomial coefficients § Logarithmic, linear, polynomial, exponential growth § The function, domain of definition, and image § Characteristics of functions, operations on functions, in particular composite functions § Linear functions, polynomials § Continuity and approximation § Introduction to differential calculus § Sum, product, and chain rules quotient rule § Cost function and its characteristics; interpretation of derivation as limiting value
Links to other modules	The content of this module is linked to the following modules: w.BA.XX.1SwE.XX
	w.BA.XX.2Busl-WIN.XX
	w.BA.XX.2FinAcc-WIN.XX
	w.BA.XX.2Mark-WIN.XX
	w.BA.XX.2Mathe2-WIN.XX
	w.BA.XX.2OP.XX
	w.BA.XX.2REng.XX
	w.BA.XX.2Stat-WIN.XX
	w.BA.XX.2VWL-WIN.XX
	w.BA.XX.2WEng-WIN.XX
	w.BA.XX.2WIN.XX
Methods of Instruction	§ Lecture § Interactive Instruction § Application Tasks § Exercises § Literature Review § Discussion § Exercises using the computer **Social Settings Used:** Individual Work

Digital Resources	§ Reader § Teaching Videos § Teaching Materials § Practice and Application Exercises (with Key) § Multiple Choice Tests § Online programming examples

Type of Instruction	Classroom Instruction	Guided Self-Study	Autonomous Self-Study
Large Class	28 h	-	
Small Class	14 h	16 h	
Group Instruction	-	-	
Practical Work	-	-	
Seminar	-	-	
Total	**42 h**	**16 h**	**32 h**

Performance Assessment

End-of-module exam	Form	Length (min.)	Weighting
Written exam	Specified documentation	90	100,00 %
Permitted Resources	Approved calculator according to "Guidelines on Supplementary Materials"		

Others	Assessment	Length (min.)	Weighting
-	-	-	-

Classroom Attendance Requirement	None but active participation in class activities highly recommended
Language of Instruction/Examination	German
Compulsory Reading	§ Lecture notes
Recommended Reading	§ Becker, J., Hobein, G., Jud, M., Scherrer, B., Sickinger, W. & Stahl, S. (2016). Wirtschaftsmathematik 1: Theorie und Beispiele. 2nd edition. Zürich: Compendio Bildungsmedien. ISBN 978-3715571058. § Becker, J., Hobein, G., Jud, M., Scherrer, B., Sickinger, W. & Stahl, S. (2016). Wirtschaftsmathematik 1: Übungen und Lösungen. 3rd edition. Zürich: Compendio Bildungsmedien. ISBN 978-3715571041. § (2016). Mathematik im Betrieb. Praxisbezogene Einführung mit Beispielen. 12th edition. Wiesbaden: Gabler. ISBN 978-3-8349-4745-1. § Purkert, W. (2011). Brückenkurs Mathematik für Wirtschaftswissenschaftler. 7th edition. Wiesbaden: Vieweg+Teubner. ISBN 978-3834815057.
Comments	A refresher course covering the mathematics curriculum of the vocational baccalaureate is offered in August and September. A self-assessment test to assess your level of mathematical knowledge is available online. -- For students of ZHAW, the textbooks by Holland/Holland and Purkert are available online for free via the libary.