Module Name: Mathematics 2		
Module Code	w.BA.XX.2Mathe2-WIN.XX	
Module Description	Students know, understand, and master the basic set of tools of mathematical analysis in subject areas of differentiation, series, exponential- and logarithmic functions, and integration. In addition, they have a basic knowledge of financial mathematics. Students are able to apply these instruments when describing and analyzing IT and economic issues.	
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	"Mathematics 1"; familiarity with spreadsheets (e.g., MS 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 § Creativity & Innovation Social Competence § Written Communication § Oral Communication § Teamwork & Conflict Management Self-Competence § Self-Management & Self-Reflection § Ethical & Social Responsibility § Learning & Change	
Module Learning Objectives	Students... § explain the relationship between, monotonicity, curvature, and derivatives. They are also able to explain extremal and inflection points and interpret these concepts geometrically. § formalize and solve simple linear and non-linear optimization problems. § explain the concept of the series both in general terms and in the case of the geometric series. They are able to apply the sum formula for a geometric series. § explain the notions “finite” and “infinite annuity”, and illustrate them by means of practical examples. § explain the concepts of “cash flow”, “discounting”, and “present value”, as well as their application in financial mathematics. § explain the relevance of the Euler number, the exponential function, and the natural logarithm, as well as their interrelations. § interpret elasticity both mathematically and in applications, in particular, as the slope in a log-log plot, and apply derivative and elasticity for estimating absolute and relative changes. § explain partial derivatives, determine and interpret them geometrically. They then apply these to determine extreme points of functions in several variables. § explain the interrelationship between differentiation and Integration, and determine the antiderivatives of simple functions. § interpret the definite integral as an area and calculate areas using the integral. § evaluate the possibilities and limitations of formal models.	

	§ use approximation procedures to make estimates and reflect on plausibility. § use logically correct arguments and formal mathematical approaches effectively both orally and in writing. § work on abstract and mathematical content autonomously using appropriate literature sources. § identify and close gaps in their knowledge autonomously.
Module Content	§ Monotonicity, curvature, extremal points, points of inflection § Optimization problems § Series, in particular geometric series § Eulerian number, exponential function, natural logarithm § Differentiation of exponential and logarithmic functions § Basics of financial mathematics: present value, discounting, finite and infinite annuities, continuous interest rate § Elasticities: their meaning and use § Basics of the differentiation of functions in multiple variables § Definite and indefinite integral § Elementary rules of integration § Integral as area
Links to other modules	-
Methods of Instruction	§ Lecture § Interactive Instruction § Exercises § Discussion § Exercises using the computer **Social Settings Used:** Individual Work
Digital Resources	§ Reader § Teaching Videos § Teaching Materials § Practice and Application Exercises (with Key)

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	No formal attendance required but participation in classroom sessions is strongly recommended
Language of Instruction/Examination	German
Compulsory Reading	§ Holland, H. & Holland, D. (2016). Mathematik im Betrieb. Praxisbezogene Einführung mit Beispielen. 12th edition. Wiesbaden: Springer Gabler. ISBN 978-3-8349-4745-1. ZHAW students have free access to the online version of the book. § Purkert, W. (2014). Brückenkurs Mathematik für Wirtschaftswissenschaftler. 8th edition. Wiesbaden: Springer Gabler. ISBN 978-3834819321. ZHAW students have free access to the online version of the book.
Recommended Reading	§ Scherrer, B., Becker, J., Hobein, G., Jud, M., Sickinger, W. & Stahl, M. (2016). Wirtschaftsmathematik 2: Theorie und Beispiele. 2nd edition. Zürich: Compendio. ISBN 978-3-7155-9897-0. § Scherrer, B., Becker, J., Jud, M., Hobein, G., Sickinger, W. & Stahl, M. (2016). Wirtschaftsmathematik 2: Übungen mit Lösungen. 3rd edition. Zürich: Compendio. ISBN 978-3-7155-7445-5.
Comments	Compulsory reading materials are freely available online for ZHAW students