Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Basic module

Module number	220000-701 (Version 01)
Module name	Mathematics for Science and Engineering I
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: • Propositional logic, sets, relations, numbers, elementary functions • Matrices and determinants • Linear systems of equations • Analytic geometry • Eigenvalue problems • Functions, limits, derivation Qualification goals: Students know the basic concepts of logic, set theory, linear algebra and analytical geometry. They will be able to relate these to each other and visualise relationships. Furthermore, they are able to independently apply the fundamentals taught to problems and solve corresponding tasks.
Teaching methods	Teaching forms of the module are lecture, tutorial and practical course. • V: Mathematics for Science and Engineering I (4 LVS) • Ü:Mathematics for Science and Engineering I(2 LVS) • P: Mathematics for Science and Engineering I (2 LVS)
Prerequisites for participation (recommended knowledge and skills)	none
Applicability of the module	---
Requirements for the awarding of credit points	The fulfilment of the admission requirements for the examination and the successful completion of the module examination are prerequisites for the awarding of credit points. The admission requirement is the following preliminary examination performance (can be repeated indefinitely): • Completion of 5 task complexes for the practical course Mathematics for Science and Engineering I, of which 4 task complexes must be passed individually. A pass means that at least 50 per cent of the assessment points have been achieved.
Module examination	The module examination consists of one examination: • 120-minute written examination on Mathematics for Science and Engineering I (examination number: 20272)
Credit points and grades	10 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every academic year in the winter semester.
Workload	The module comprises a total student workload of 300 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Basic module

Module number	220000-702 (Version 01)
Module name	Mathematics for Science and Engineering II
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: • Series, power series, Taylor series • Differential and integral calculus for functions of one variable • Theory and solution of ordinary differential equations • Numerical techniques for solving ordinary differential equations • Modelling and simulation of mechanical systems with ordinary differential equations • Fourier series Intended learning outcomes: Students are familiar with the basics of analysis, in particular differential and integral calculus. They will be able to differentiate and integrate functions of one variable. Furthermore, they are able to solve simple ordinary differential equations analytically and numerically. To this end, they are proficient in various techniques. The students know the most important convergence statements about Taylor and Fourier series and can develop given functions in these series.
Teaching methods	Teaching forms of the module are lecture, exercise and practical course. • V:Mathematics for Science and Engineering II(4 LVS) • Ü:Mathematics for Science and Engineering II(2 LVS) • P: Mathematics for Science and Engineering II (2 LVS)
Prerequisites for participation (recommended knowledge and skills)	none
Applicability of the module	---
Requirements for the awarding of credit points	The fulfilment of the admission requirements for the examination and the successful completion of the module examination are prerequisites for the awarding of credit points. The admission requirement is the following preliminary examination performance (can be repeated indefinitely): • Completion of 5 task complexes for the practical course Mathematics for Science and Engineering II, of which 4 task complexes must be passed individually. A pass means that at least 50 per cent of the assessment points have been achieved.
Module examination	The module examination consists of one examination: • 120-minute written examination on Mathematics for Science and Engineering II (examination number: 20274)
Credit points and grades	10 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every academic year in the summer semester.
Workload	The module comprises a total student workload of 300 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Basic module

Module number	220000-703 (Version 01)
Module name	Mathematics for Science and Engineering III
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: • Differential and integral calculus for functions with several variables • Laplace and Fourier transformation • Introduction to partial differential equations (potential equation, heat conduction, wave equation) • Finite difference method for solving partial differential equations • Vector analysis (curve integrals and integral theorems) Qualification goals: The students are proficient in the differentiation of functions of several variables and can categorise the various derivation terms in particular. They are proficient in area, surface and curve integrals and can calculate them. Students are familiar with Laplace and Fourier transforms and can use them as analytical tools. Furthermore, students will be able to name basic concepts and important representatives of partial differential equations and will be able to apply the finite difference method to solve partial differential equations.
Teaching methods	Teaching forms of the module are lecture, exercise and practical course. • V:Mathematics for Science and Engineering III(4 LVS) • Ü:Mathematics for Science and Engineering III(2 LVS) • P: Mathematics for Science and Engineering III (2 LVS)
Prerequisites for participation (recommended knowledge and skills)	none
Applicability of the module	---
Requirements for the awarding of credit points	The fulfilment of the admission requirements for the examination and the successful completion of the module examination are prerequisites for the awarding of credit points. The admission requirement is the following preliminary examination performance (can be repeated indefinitely): • Completion of 5 task complexes for the practical course Mathematics for Science and Engineering III, of which 4 task complexes must be passed individually. A pass means that at least 50 per cent of the assessment points have been achieved.
Module examination	The module examination consists of one examination: • 120-minute written examination on Mathematics for Science and Engineering III (examination number: 20276)
Credit points and grades	10 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every academic year in the winter semester.
Workload	The module comprises a total student workload of 300 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Basic module

Module number	220000-704 (Version 01)
Module name	Mathematics for Science and Engineering IV
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: • Probability theory • Statistics • Function theory • Advanced algebraic structures Qualification goals: Students know the basic concepts of probability theory as well as the most important discrete and continuous distributions and the central limit theorem. They will be able to apply and correctly interpret point and interval estimators and statistical tests from statistics. Students know the most important properties of holomorphic functions, in particular Cauchy's integral theorem and the residue theorem. Furthermore, the students master elementary number theory basics, algebraic structures such as groups, rings and solids.
Teaching methods	Teaching forms of the module are lecture, tutorial and practical course. • V: Mathematics for Science and Engineering IV(4 LVS) • Ü:Mathematics for Science and Engineering IV(2 LVS) • P:Mathematics for Science and Engineering IV(2 LVS)
Prerequisites for participation (recommended knowledge and skills)	none
Applicability of the module	---
Requirements for the awarding of credit points	The fulfilment of the admission requirements for the examination and the successful completion of the module examination are prerequisites for the awarding of credit points. The admission requirement is the following preliminary examination performance (can be repeated indefinitely): • Completion of 5 task complexes for the practical course Mathematics for Science and Engineering IV, of which 4 task complexes must be passed individually. A pass means that at least 50 per cent of the assessment points have been achieved.
Module examination	The module examination consists of one examination: • 120-minute written examination on Mathematics for Science and Engineering IV (examination number: 20278)
Credit points and grades	10 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every academic year in the summer semester.
Workload	The module comprises a total student workload of 300 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Basic module

Module number	220000-140 (Version 01)
Module name	Mathematical Training I
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: Fundamentals of analysis and linear algebra Qualification goals: The students know elementary mathematical proof principles and can understand and comprehend proofs of basic results from analysis and linear algebra. Furthermore, they are able to independently establish proofs of such results.
Teaching methods	The teaching form of the module is the exercise. • Ü: Mathematical Training I (4 LVS)
Prerequisites for participation (recommended knowledge and skills)	none
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: • 2 written assignments to be completed in the tutorials on Mathematical Training I (examination number: 20280)
Credit points and grades	5 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every academic year in the winter semester.
Workload	The module comprises a total student workload of 150 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Basic module

Module number	220000-141 (Version 01)
Module name	Mathematical Training II
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: Advanced topics in analysis and linear algebra Qualification goals: The students know advanced mathematical proof principles and can understand and comprehend proofs of deeper results from analysis and linear algebra. Furthermore, they are able to independently establish proofs of such results.
Teaching methods	The teaching form of the module is the exercise. • Ü: Mathematical Training II (4 LVS)
Prerequisites for participation (recommended knowledge and skills)	none
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: • 2 written assignments to be completed in the tutorials on Mathematical Training II (examination number: 20281)
Credit points and grades	5 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every academic year in the summer semester.
Workload	The module comprises a total student workload of 150 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Basic module

Module number	220000-142 (Version 01)
Module name	Computational Machine Learning
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: • Version control and reproducibility • Working with the console and Unix systems • Jupyter notebooks • Collaborative coding environments and AI-assisted coding • hardware architectures • Profiling and efficient programming Qualification goals: Students will be able to explain basic concepts of version control and use common tools. They will be able to create reproducible workflows and use the Linux shell and its basic commands with confidence. They will be able to recognise the benefits of Jupyter notebooks as a tool for collaborative development and research and apply them accordingly. They also master the basics of modern hardware architectures (such as CPU, GPU) and are able to develop optimisation strategies in order to use memory and runtime resources efficiently.
Teaching methods	Teaching forms of the module are seminar and exercise. • S: Computational Machine Learning (2 LVS) • Ü: Computational Machine Learning (2 LVS)
Prerequisites for participation (recommended knowledge and skills)	none
Applicability of the module	---
Requirements for the awarding of credit points	The fulfilment of the admission requirements for the examination and the successful completion of the module examination are prerequisites for the awarding of credit points. The admission requirement is the following preliminary examination (can be repeated indefinitely): • 4 programming assignments of 5 AS each for the Computational Machine Learning exercise
Module examination	The module examination consists of one examination: • 120-minute written examination on Computational Machine Learning (examination number: 20282) Repeat examinations can take the form of 30-minute oral examinations.
Credit points and grades	5 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every academic year in the winter semester.
Workload	The module comprises a total student workload of 150 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Basic module

Module number	220000-110 (Version 01)
Module name	Scientific Programming
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents • Elementary programming concepts • Introduction to programming languages from a mathematical perspective • elementary mathematical algorithms • Application to simple mathematical problems • Introduction to documentation and reproducibility Qualification goals: Students are familiar with the landscape of programming languages used in mathematics. They understand elementary programming terms, algorithmic methods and algorithmic concepts. Furthermore, they are able to solve simple programming tasks in a mathematical context using at least one programming language.
Teaching methods	The module consists of lectures and tutorials. • V: Scientific Programming (2 LVS) • Ü: Scientific Programming (2 LVS)
Prerequisites for participation (recommended knowledge and skills)	none
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: • 90-minute written examination on Scientific Programming (examination number: 20284) Repeat examinations can take the form of 30-minute oral examinations.
Credit points and grades	5 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every academic year in the summer semester.
Workload	The module comprises a total student workload of 150 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Basic module

Module number	220000-120 (Version 01)
Module name	Mathematicalical Modelling in Economics
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: Basic concepts of mathematical economics (consumer behaviour, production management, market equilibrium, pricing of goods, location planning, resource allocation, etc.), Linear, discrete, stochastic, dynamic and game-theoretical models from micro- and macroeconomics, such as input-output analysis, discrete choice experiments, economic growth, oligopoly, diffusion of innovations, income inequality, etc. Qualification goals: Students are able to model problems with economic relevance. They can categorise, classify and analyse them using appropriate mathematical tools. They are sensitised to the limited ability to interpret the results obtained in this way and are aware of the importance of the model assumptions. They are able to slightly adapt the models they have learnt and exchange mathematically precise information.
Teaching methods	The module consists of lectures and tutorials. • V: Mathematical Modelling in Economics (4 LVS) • Ü: Mathematical Modelling in Economics (2 LVS)
Prerequisites for participation (recommended knowledge and skills)	none
Applicability of the module	---
Requirements for the awarding of credit points	The fulfilment of the admission requirements for the examination and the successful completion of the module examination are prerequisites for the awarding of credit points. The admission requirement is the following preliminary examination performance (can be repeated indefinitely): • Proof of exercises on Mathematical Modelling in Economics totalling 120 assessment units (for group work per student). Proof is provided when at least 50 % of the assessment units have been demonstrated.
Module examination	The module examination consists of one examination: • 30-minute oral examination on Mathematical Modelling in Economics (examination number: 20292) The examination can be held in German or English.
Credit points and grades	10 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every academic year in the winter semester.
Workload	The module comprises a total student workload of 300 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Basic module

Module number	220000-705 (Version 01)
Module name	Applied Optimisation
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: Mathematical optimisation deals with the task of minimising an objective function over a given admissible set. The module is designed for non-mathematical degree programmes and provides a rough overview of methods and techniques for formulating and solving classes of basic optimisation problems and for the critical interpretation of solution information. Qualification goals: The students are able to formulate and classify optimisation problems correctly, to model them in a goal-oriented way, to select suitable solution methods based on knowledge of the fundamentals and an understanding of how they work, to interpret and question results critically and to implement simple solution methods algorithmically themselves. Teamwork is encouraged through group work in the exercises.
Teaching methods	The module consists of lectures and tutorials. • V: Applied Optimisation(2 LVS) • Ü: Applied Optimisation(2 LVS)
Prerequisites for participation (recommended knowledge and skills)	Familiarity with basic concepts of linear algebra and multidimensional differential calculus
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: • 30-minute oral examination on Applied Optimisation (examination number: 20293) The examination can be held in German or English.
Credit points and grades	5 credit points are earned in the module. The assessment of the examination performance and the formation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the programme	The module is offered every academic year in the winter semester.
Workload	The module comprises a total student workload of 150 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Basic module

Module number	220000-113 (Version 01)
Module name	Numerical Methods
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: • Representation of numbers and rounding errors • Condition and numerical stability • Numerical solution of linear systems of equations • non-linear systems of equations • Interpolation and approximation of functions • Numerical integration (quadrature) • Outlook on numerical solution of initial value problems for ordinary differential equations Qualification goals: The students can explain the basics of computer arithmetic and the concept of rounding errors. They have an overview of basic mathematical tasks, such as solving systems of equations, interpolation, approximation and quadrature. You will be able to evaluate procedures, in particular with error analyses and with regard to condition and stability. Various numerical methods can be implemented and applied in a programming language.
Teaching methods	The module consists of lectures and tutorials. • V: Numerical Methods (4 LVS) • Ü: Numerical Methods (2 LVS)
Prerequisites for participation (recommended knowledge and skills)	none
Applicability of the module	---
Requirements for the awarding of credit points	The fulfilment of the admission requirements for the examination and the successful completion of the module examination are prerequisites for the awarding of credit points. The admission requirement is the following preliminary examination performance (can be repeated indefinitely): • Proof of exercises on Numerical Methods totalling 120 assessment units (for group work per student). Proof is provided when at least 50 % of the assessment units have been demonstrated.
Module examination	The module examination consists of one examination: • 120-minute written examination on Numerical Methods (examination number: 20294) Repeat examinations can take the form of 30-minute oral examinations. The examination can be taken in German or English.
Credit points and grades	10 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every academic year in the summer semester.
Workload	The module comprises a total student workload of 300 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Basic module

Module number	220000-143 (Version 01)
Module name	Statistical Modelling
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: • Probabilistic model of the data • Statistical model for univariate data • Conditional statistical model • Linear models • Feed-forward neural networks • Autoregressive models • Autoregressive transformer Theaim of this module is to introduce students to parametric statistical models that are particularly useful in data science. First, the standard models of inferential statistics for univariate data are introduced. Conditional statistical models are then introduced using examples from machine learning and time series analysis. The lecture is complemented by exercises in which machine learning algorithms are used to estimate parametric statistical models.
Teaching methods	The module consists of lectures and tutorials. • V: Statistical Modelling (2 LVS) • Ü: Statistical Modelling (1 LVS)
Prerequisites for participation (recommended knowledge and skills)	Basic knowledge of linear algebra, analysis and elementary probability theory
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: • 30-minute oral examination on Statistical Modelling (examination number: 20285)
Credit points and grades	5 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every academic year in the summer semester.
Workload	The module comprises a total student workload of 150 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Basic module

Module number	243033015 (Version 01)
Module name	Digital Systems
Responsible for the module	Chair of Digital and Circuit Technology
Contents and qualification goals	Contents: Topics are in detail • Introduction to the theory of digital systems: Binary functions, number representations, codes, contact algebra, Boolean forms, Karnaugh plan • Design of combinatorial switching networks: gate circuits, synthesis principles • Automata: Models, concept of state, temporal behaviour, synthesis • Design of sequential switching networks: flip-flop, behaviour, structure • Application of digital systems using examples: PLC Qualification goals: The students have knowledge of the design and description of digital systems and their functionality.
Teaching methods	The module consists of lectures and tutorials. • V: Digital Systems(2 LVS) • Ü: Digital Systems(3 LVS) The courses will be held in English.
Prerequisites for participation (recommended knowledge and skills)	none
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: • 90-minute written examination on Digital Systems (examination number: 41204) The examination is to be taken in English.
Credit points and grades	5 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every academic year in the winter semester.
Workload	The module comprises a total student workload of 150 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Basic module

Module number	243031010 (Version 03)
Module name	Mikroprozessortechnik / Microprocessor Technology
Responsible for the module	Chair of Circuit and System Design
Contents and qualification goals	Contents: Basic knowledge of the structure and operation of computers/microprocessors, their components and their interfaces as a universal information technology unit; familiarisation with and use of hardware-related programming languages; learning the technical terms of computer technology in English and German. Qualification goals: The students have basic knowledge of microcontrollers/microprocessors and their programming. On the basis of this knowledge, they will be able to use computers/microcontrollers in electro- and mechatronic applications in a targeted manner. They are able to extract relevant information from simple technical documentation/data sheets in German and English.
Teaching methods	Teaching forms of the module are lecture, tutorial and seminar. • V: Mikroprozessortechnik / Microprocessor Technology(1 LVS) • Ü: Mikroprozessortechnik / Microprocessor Technology(2 LVS) • S: Mikroprozessortechnik / Microprocessor Technology (2 LVS) The courses are held in German and in English.
Prerequisites for participation (recommended knowledge and skills)	German language skills at level A1
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: • 120-minute written examination on Mikroprozessortechnik / Microprocessor Technology (examination number: 42602) The examination can be taken in German or English.
Credit points and grades	5 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every academic year in the summer semester.
Workload	The module comprises a total student workload of 150 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Specialisation module

Module number	220000-151 (Version 01)
Module name	Proseminar Mathematik (Introductory Seminar Mathematics)
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: Topics on a mathematical sub-area are presented, which are to be prepared, summarised in writing and presented on the basis of selected scientific literature. Qualification goals: Students are able to read and understand scientific texts independently. They are able to conceptualise their work based on the task at hand. Existing scientific findings from various sources can be presented in writing and summarised in a comprehensible manner. Furthermore, they are able to present their work using suitable techniques within a given time frame.
Teaching methods	The teaching form of the module is the seminar. • S: Proseminar Mathematics (2 LVS)
Prerequisites for participation (recommended knowledge and skills)	none
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: • 60-minute presentation with written elaboration on a topic assigned in the mathematics proseminar of approx. 5 pages (examination number: 20164P) The examination can be held in German or English.
Credit points and grades	5 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every academic year in the summer semester.
Workload	The module comprises a total student workload of 150 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

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Specialisation module

Module number	220000-106 (Version 01)
Module name	Maß- und Integrationstheorie (Measurement and Integration Theory)
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: • Set systems and functions • Caratheodory's continuation theorem • Measurable and integrable functions • Types of convergence of measurable functions and their relationships • Limit theorems: Fatou's lemma, theorems of majorised and monotone convergence • Interchange of integral and limit • Product measure and integration in product spaces: the theorems of Fubini and Tonelli • Lebesgue spaces and completeness • Transformation formula • Hausdorff measures and dimension Qualification goals: The students are familiar with the basic concepts of measure theory and Lebesgue's integration theory. They will be able to explain the Lebesgue measure and integral, apply the limit theorems and visualise integration in product spaces. They master basic concepts and methods of measure and integration theory and understand their application in analysis and stochastics.
Teaching methods	The module consists of lectures and tutorials. • V: Theory of Measurement and Integration (4 LVS) • Ü: Measure and Integration Theory (2 LVS) The courses can be held in German or in English.
Prerequisites for participation (recommended knowledge and skills)	none
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: • 30-minute oral examination on measurement and integration theory (examination number: 20003) The examination can be held in German or English.
Credit points and grades	10 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every academic year in the winter semester.
Workload	The module comprises a total student workload of 300 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

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Specialisation module

Module number	220000-107 (Version 01)
Module name	Vektoranalysis und Gewöhnliche Differentialgleichungen (Vector Analysis and Ordinary Differential Equations)
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: • Submanifolds in R^n • Differential form calculus, divergence, gradient, rotation • Integration on submanifolds in R^n • Gauss' theorem and Stokes' theorem • Existence and uniqueness theorems for initial value problems • Linear systems of ordinary differential equations • Basic concepts of dynamical systems Qualification goals: Students will be able to describe the fundamental relationships in vector analysis and integration theory as well as the theory of ordinary differential equations and dynamical systems. They will be able to calculate domain and surface integrals and apply integral theorems. They are able to solve linear differential equations and apply the solution theory of non-linear equations. Furthermore, they understand the basic concepts taught and can explain them.
Teaching methods	The module consists of lectures and tutorials. • V: Vector Analysis and Ordinary Differential Equations (4 LVS) • Ü: Vector Analysis and Ordinary Differential Equations (2 LVS) The courses can be held in German or in English.
Prerequisites for participation (recommended knowledge and skills)	Basic knowledge of measure and integration theory
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: • 30-minute oral examination on Vector Analysis and Ordinary Differential Equations (examination number: 20012) The examination can be held in German or English.
Credit points and grades	10 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every academic year in the summer semester.
Workload	The module comprises a total student workload of 300 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

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Specialisation module

Module number	220000-112 (Version 01)
Module name	Grundlagen der Optimierung (Fundamentals of Optimization)
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: • Optimality conditions for free and constrained optimisation • Convexity, separation theorems, Lagrange function • Linear optimisation (theory and solution methods) • Realisation with software tools Qualification goals: Students will be able to describe the fundamental relationships in linear optimisation and explain basic concepts in an understandable way. They will be able to model problems in a goal-oriented way, formulate optimisation problems correctly and classify them. Furthermore, they are familiar with various solution methods and can select suitable methods. Solutions can be analysed analytically and qualitatively with regard to their correctness and sensitivity. Simple solution methods can be algorithmically implemented independently.
Teaching methods	The module consists of lectures and tutorials. • V: Fundamentals of Optimisation (4 LVS) • Tutorial: Fundamentals of Optimisation (2 LVS) The courses can be held in German or in English.
Prerequisites for participation (recommended knowledge and skills)	none
Applicability of the module	---
Requirements for the awarding of credit points	The fulfilment of the admission requirements for the examination and the successful completion of the module examination are prerequisites for the awarding of credit points. The admission requirement is the following preliminary examination performance (can be repeated indefinitely): • Proof of exercises on the fundamentals of optimisation amounting to a total of 120 assessment units (for group work per student). Proof is provided when at least 50 % of the assessment units have been demonstrated.
Module examination	The module examination consists of one examination: • 30-minute oral examination on Fundamentals of Optimisation (examination number: 22204) The examination can be held in German or English.
Credit points and grades	10 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every academic year in the winter semester.
Workload	The module comprises a total student workload of 300 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Specialisation module

Module number	220000-114 (Version 01)
Module name	Wahrscheinlichkeitstheorie (Probability theory)
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: • Introduction to probabilistic models • Kolmogoroff's axiomatics • Random variables, important distribution types • conditional expected values • Characteristic functions • Laws of large numbers and limit theorems • Sequences and sums of independent random variables • Applications in science, technology and economics Qualification goals: Students can explain basic concepts from probability theory and present models. They understand processes under the influence of chance and can independently develop models for these processes and draw conclusions from them. The laws of large numbers and the marginal distribution theorems can be illustrated clearly. Furthermore, they are familiar with the proof techniques of the field. They can reproduce proofs of important statements and explain the steps involved. Students develop an initial understanding of applications in science, technology and economics.
Teaching methods	The module is taught in lectures and tutorials. • V: Probability Theory (4 LVS) • Ü: Probability Theory (2 LVS) The courses can be held in German or in English.
Prerequisites for participation (recommended knowledge and skills)	Basic knowledge of measure and integration theory
Applicability of the module	---
Requirements for the awarding of credit points	The fulfilment of the admission requirements for the examination and the successful completion of the module examination are prerequisites for the awarding of credit points. The admission requirement is the following preliminary examination performance (can be repeated indefinitely): • Proof of exercises on probability theory totalling 120 assessment units (for group work per student). Proof is provided when at least 50 % of the assessment units have been demonstrated.
Module examination	The module examination consists of one examination: • 30-minute oral examination on probability theory (examination number: 20075) The examination can be held in German or English.
Credit points and grades	10 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every academic year in the summer semester.
Workload	The module comprises a total student workload of 300 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Specialisation module

Module number	220000-115 (Version 01)
Module name	Algebra
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: • Elementary group theory (semigroups, Lagrange's theorem, factor groups) • Group theory (Sylow theorems, solvable groups) • Construction with compass and ruler • Field theory (splitting fields, normal and sepearable extensions) • Main theorem of Galois theory • Solving algebraic equations Qualification goals: The students are able to deal strictly formally with abstract operations that follow simple laws. They will be able to relate the basic concepts of algebra that they have already learnt to their extensions. They can explain concepts from group, solid and Galois theory and show connections. Furthermore, students can independently apply algebraic methods and theories and link them to other mathematical disciplines.
Teaching methods	The module consists of lectures and tutorials. • V: Algebra (4 LVS) • Ü: Algebra (2 LVS) The courses can be held in German or in English.
Prerequisites for participation (recommended knowledge and skills)	none
Applicability of the module	---
Requirements for the awarding of credit points	The fulfilment of the admission requirements for the examination and the successful completion of the module examination are prerequisites for the awarding of credit points. The admission requirement is the following preliminary examination performance (can be repeated indefinitely): • Proof of exercises in algebra totalling 120 assessment units (for group work per student). Proof is provided when at least 50 % of the assessment units have been demonstrated.
Module examination	The module examination consists of one examination: • 30-minute oral examination on algebra (examination number: 21101) The examination can be held in German or English.
Credit points and grades	10 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every academic year in the winter semester.
Workload	The module comprises a total student workload of 300 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Specialisation module

Module number	220000-116 (Version 01)
Module name	Einführung in die Diskrete Mathematik (Introduction to Discrete Mathematics)
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: • Combinatorics • Graph theory • Matroids • Complexity theory • Algorithms Qualification goals: Students are able to explain basic concepts and relationships from the fields of combinatorics, graph theory, matroids and complexity theory. They will be able to formulate combinatorial counting and optimisation problems. Students develop algorithmic thinking, i.e. they can make correct runtime estimates and assess the complexity of optimisation tasks. Furthermore, they know important theorems and algorithms from the above-mentioned areas and can apply proof techniques from them.
Teaching methods	The module consists of lectures and tutorials. • V: Introduction to Discrete Mathematics (4 LVS) • Ü: Introduction to Discrete Mathematics (2 LVS) The courses can be held in German or in English.
Prerequisites for participation (recommended knowledge and skills)	none
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: • 30-minute oral examination on Introduction to Discrete Mathematics (examination number: 21202) The examination can be held in German or English.
Credit points and grades	10 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every academic year in the summer semester.
Workload	The module comprises a total student workload of 300 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Specialisation module

Module number	220000-117 (Version 01)
Module name	Funktionentheorie (Function theory)
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: • Complex differentiability and conformal mappings • Path integrals, index of closed curves • Local power series development of holomorphic functions • Cauchy's integral theorem and Cauchy's integral formula • Elementary properties of holomorphic functions: Identity theorem, maximum principle, Liouville's theorem, fundamental theorem of algebra • Classification of isolated singularities, Laurent decomposition • Residue calculus Qualification goals: The students are familiar with the basic principles of function theory and know their significance for real analysis. They are able to differentiate complex functions and are proficient in dealing with functions with singularities. They are able to calculate integrals and know important integral theorems.
Teaching methods	The module consists of lectures and tutorials. • V: Theory of Functions (4 LVS) • Ü: Function Theory (2 LVS) The courses can be held in German or in English.
Prerequisites for participation (recommended knowledge and skills)	none
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: • 30-minute oral examination on function theory (examination number: 20076) The examination can be held in German or English.
Credit points and grades	10 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every academic year in the winter semester.
Workload	The module comprises a total student workload of 300 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Specialisation module

Module number	220000-118 (Version 01)
Module name	Mathematische Statistik (Mathematical Statistics)
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: • Basic concepts of mathematical statistics • empirical measures • Estimation theory • test theory • Selected methods of mathematical statistics Qualification goals: Students can describe basic concepts of mathematical statistics and explain them using examples, such as the construction of estimators (substitution and maximum likelihood method), optimal unbiased estimators, optimal tests for parametric distribution classes, sufficiency and completeness and their application to estimation and test problems, tests with normal distribution and confidence intervals. They are able to discuss and explain relationships between the concepts mentioned. Furthermore, they are familiar with the proof techniques of mathematical statistics and can apply them independently.
Teaching methods	The module is taught in lectures and tutorials. • V: Mathematical Statistics (4 LVS) • Ü: Mathematical Statistics (2 LVS) The courses can be held in German or in English.
Prerequisites for participation (recommended knowledge and skills)	Basic knowledge of probability theory
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: • 30-minute oral examination on Mathematical Statistics (examination number: 20057) The examination can be held in German or English.
Credit points and grades	10 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every academic year in the winter semester.
Workload	The module comprises a total student workload of 300 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Specialisation module

Module number	220000-160 (Version 01)
Module name	Forschungsmodul Mathematik A (groß) (Research Module Mathematics A (large))
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: In order to provide an insight into current research topics, areas of application, modelling techniques, concrete scientific work or preparatory topic-specific foundations, special mathematical courses are offered at irregular intervals in which typical proof techniques and methodological approaches are developed. Qualification goals: The aim is to create a basis for scientific work in a thematically restricted current mathematical field.
Teaching methods	The module is taught in the form of lectures, possibly with exercises, usually totalling 6 LVS (deviations are possible in justified cases). Courses that may be selected for this module are listed in the current course catalogue and can be held in German or English. Courses offered can only be selected in one module at a time.
Prerequisites for participation (recommended knowledge and skills)	none
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: • 30-minute oral examination on the contents of the module (examination number: 20286) The examination can be held in German or English.
Credit points and grades	10 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the programme	The module is offered according to the range of courses on current research topics.
Workload	The module comprises a total student workload of 300 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Specialisation module

Module number	220000-161 (Version 01)
Module name	Forschungsmodul Mathematik A (klein) (Research Module Mathematics A (small))
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: In order to provide an insight into current research topics, areas of application, modelling techniques, concrete scientific work or preparatory topic-specific foundations, special mathematical courses are offered at irregular intervals in which typical proof techniques and methodological approaches are developed. Qualification goals: The aim is to create a basis for scientific work in a thematically restricted current mathematical field.
Teaching methods	The module is taught in the form of lectures, possibly with exercises, usually totalling 3 LVS (deviations are possible in justified cases). Courses that may be selected for this module are listed in the current course catalogue and can be held in German or English. Courses offered can only be selected in one module at a time.
Prerequisites for participation (recommended knowledge and skills)	none
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: • 30-minute oral examination on the contents of the module (examination number: 20287) The examination can be held in German or English.
Credit points and grades	5 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the programme	The module is offered according to the range of courses on current research topics.
Workload	The module comprises a total student workload of 150 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Specialisation module

Module number	220000-162 (Version 01)
Module name	Forschungsmodul Mathematik B (groß) (Research Module Mathematics B (large))
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: In order to provide an insight into current research topics, areas of application, modelling techniques, concrete scientific work or preparatory topic-specific foundations, special mathematical courses are offered at irregular intervals in which typical proof techniques and methodological approaches are developed. Qualification goals: The aim is to create a basis for scientific work in a thematically restricted current mathematical field.
Teaching methods	The module is taught in the form of lectures, possibly with exercises, usually totalling 6 LVS (deviations are possible in justified cases). Courses that may be selected for this module are listed in the current course catalogue and can be held in German or English. Courses offered can only be selected in one module at a time.
Prerequisites for participation (recommended knowledge and skills)	none
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: • 30-minute oral examination on the contents of the module (examination number: 20288) The examination can be held in German or English.
Credit points and grades	10 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the programme	The module is offered according to the range of courses on current research topics.
Workload	The module comprises a total student workload of 300 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Specialisation module

Module number	220000-163 (Version 01)
Module name	Forschungsmodul Mathematik B (klein) (Research Module Mathematics B (small))
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: In order to provide an insight into current research topics, areas of application, modelling techniques, concrete scientific work or preparatory topic-specific foundations, special mathematical courses are offered at irregular intervals in which typical proof techniques and methodological approaches are developed. Qualification goals: The aim is to create a basis for scientific work in a thematically restricted current mathematical field.
Teaching methods	The module is taught in the form of lectures, possibly with exercises, usually totalling 3 LVS (deviations are possible in justified cases). Courses that may be selected for this module are listed in the current course catalogue and can be held in German or English. Courses offered can only be selected in one module at a time.
Prerequisites for participation (recommended knowledge and skills)	none
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: • 30-minute oral examination on the contents of the module (examination number: 20289) The examination can be held in German or English.
Credit points and grades	5 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the programme	The module is offered according to the range of courses on current research topics.
Workload	The module comprises a total student workload of 150 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Specialisation module

Module number	220000-164 (Version 01)
Module name	Forschungsmodul Mathematik C (groß) (Research Module Mathematics c (large))
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: In order to provide an insight into current research topics, areas of application, modelling techniques, concrete scientific work or preparatory topic-specific foundations, special mathematical courses are offered at irregular intervals in which typical proof techniques and methodological approaches are developed. Qualification goals: The aim is to create a basis for scientific work in a thematically restricted current mathematical field.
Teaching methods	The module is taught in the form of lectures, possibly with exercises, usually totalling 6 LVS (deviations are possible in justified cases). Courses that may be selected for this module are listed in the current course catalogue and can be held in German or English. Courses offered can only be selected in one module at a time.
Prerequisites for participation (recommended knowledge and skills)	none
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: • 30-minute oral examination on the contents of the module (examination number: 20290) The examination can be held in German or English.
Credit points and grades	10 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the programme	The module is offered according to the range of courses on current research topics.
Workload	The module comprises a total student workload of 300 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Specialisation module

Module number	220000-165 (Version 01)
Module name	Forschungsmodul Mathematik C (klein) (Research Module Mathematics C (small))
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: In order to provide an insight into current research topics, areas of application, modelling techniques, concrete scientific work or preparatory topic-specific foundations, special mathematical courses are offered at irregular intervals in which typical proof techniques and methodological approaches are developed. Qualification goals: The aim is to create a basis for scientific work in a thematically restricted current mathematical field.
Teaching methods	The module is taught in the form of lectures, possibly with exercises, usually totalling 3 LVS (deviations are possible in justified cases). Courses that may be selected for this module are listed in the current course catalogue and can be held in German or English. Courses offered can only be selected in one module at a time.
Prerequisites for participation (recommended knowledge and skills)	none
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: • 30-minute oral examination on the contents of the module (examination number: 20291) The examination can be held in German or English.
Credit points and grades	5 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the programme	The module is offered according to the range of courses on current research topics.
Workload	The module comprises a total student workload of 150 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Language module

Module number	136004-005 (Version 02)
Module name	Deutsch als Fremdsprache I (Niveau A1) (German as a Foreign Language I (Level A1))
Responsible for the module	Subject group leader of German as a foreign language at the Centre for Foreign Languages
Contents and qualification goals	Contents: • Teaching basic knowledge of the German language (lexis, grammar, phonetics) • Introduction and practice of lexis on simple topics such as family, shopping, living • Learning first grammatical structures and rules such as articles and declension of nouns, modal verbs, negation, verb forms in the present and perfect tense • Phonetic exercises The course is based on language competence level A1 of the Common European Framework of Reference for Languages (CEFR). Qualification goals: • Understanding familiar, everyday expressions and grasping simple sentences • Communicating simple phrases and sentences • Answering simple questions about yourself, your family, school education and studies Completion of the module corresponds to language competence level A1 of the Common European Framework of Reference for Languages (CEFR).
Teaching methods	The teaching form of the module is the exercise. • Exercise: Course 1 (4 LVS)
Prerequisites for participation (recommended knowledge and skills)	none
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: Creditable coursework: • 90-minute written examination for course 1 (examination number: 91803) The coursework is recognised if the grade of the coursework is at least "sufficient".
Credit points and grades	5 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every semester.
Workload	The module comprises a total student workload of 150 AS (60 contact hours and 90 hours of self-study).
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Language module

Module number	136004-006 (Version 02)
Module name	Deutsch als Fremdsprache II (Niveau A2) German as a Foreign Language II (Level A2)
Responsible for the module	Subject group leader of German as a foreign language at the Centre for Foreign Languages
Contents and qualification goals	Contents: • Expanding and consolidating lexis on topics such as education, activities, hobbies, leisure and work • Discovering and practising new grammatical structures, e.g. separable and inseparable verbs, reflexive verbs, consolidation of tenses, exercises on word order in various sentence constructions • Exercises on German phonetics The course is based on language competence level A2 of the Common European Framework of Reference for Languages (CEFR). Qualification goals: • Understanding frequently used expressions related to areas of most immediate relevance • Communicating about familiar and common things in a simple and direct exchange of information about them Completion of the module corresponds to language competence level A2 of the Common European Framework of Reference for Languages (CEFR).
Teaching methods	The teaching form of the module is the exercise. • Exercise: Course 2 (4 LVS)
Prerequisites for participation (recommended knowledge and skills)	Completion of previous course 1 or placement test (qualification recommendation)
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: Creditable coursework: • 90-minute written examination for course 2 (examination number: 91804) The coursework is recognised if the grade of the coursework is at least "sufficient".
Credit points and grades	5 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every semester.
Workload	The module comprises a total student workload of 150 AS (60 contact hours and 90 hours of self-study).
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Language module

Module number	136004-007 (Version 02)
Module name	Deutsch als Fremdsprache III (Niveau B1) German as a Foreign Language III (Level B1)
Responsible for the module	Subject group leader of German as a foreign language at the Centre for Foreign Languages
Contents and qualification goals	Contents: • Exercises to expand lexis and improve speaking skills • Communicative situations and tasks on topics such as time and wasting time, leisure time, daily routine, studies, work and profession, modern media • Repetition and consolidation of basic grammar and teaching of further grammatical structures, e.g. passive voice, subordinate clauses The course is based on language competence level B1 of the Common European Framework of Reference for Languages (CEFR). Qualification goals: • Improvement of speaking skills, simple and coherent utterances about familiar topics • report on experiences and events, describe goals and plans, give reasons and explanations • Communicating with the help of simple linguistic means • Understanding and writing texts on everyday topics Completion of the module corresponds to language competence level B1 of the Common European Framework of Reference for Languages (CEFR).
Teaching methods	The teaching form of the module is the exercise. • Exercise: Course 3 (4 LVS)
Prerequisites for participation (recommended knowledge and skills)	Completion of previous course 2 or placement test (qualification recommendation)
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: Creditable coursework: • 90-minute written examination for course 3 (examination number: 91805) The coursework is recognised if the grade of the coursework is at least "sufficient".
Credit points and grades	5 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every semester.
Workload	The module comprises a total student workload of 150 AS (60 contact hours and 90 hours of self-study).
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Language module

Module number	136004-016 (Version 01)
Module name	Deutsch für Ingenieure (Niveau B1+) (German for Engineers (Level B1+))
Responsible for the module	Subject group leader of German as a foreign language at the Centre for Foreign Languages
Contents and qualification goals	Contents: • Practising all language skills such as listening, speaking, reading and writing using selected technical language and everyday study-related topics from the engineering context • Practising formal and informal written and especially oral communication in everyday student and professional life (e.g. job application training, communication in the workplace) • Consolidation and expansion of grammatical structures through exercises on lexical and morpho-syntactic structures The course is based on language competence level B1 of the Common European Framework of Reference for Languages (CEFR). Qualification goals: • Understanding the main contents of common texts on engineering topics • Understand and write texts on professional topics • report on experiences and events in an engineering context using simple linguistic means • describe, justify and explain simple processes • present their own point of view on familiar engineering topics Completion of the module corresponds to language competence level B1 of the Common European Framework of Reference for Languages (CEFR).
Teaching methods	The teaching form of the module is the exercise. • Exercise: Professional language course German for engineers (4 LVS) • Tutorial: Practical training in German (2 LVS)
Prerequisites for participation (recommended knowledge and skills)	Completion of previous course 3 or placement test (qualification recommendation)
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of two examinations. The following examinations must be completed: Creditable coursework: • 70-minute written examination on the professional language course German for Engineers (examination number: 91833) • 15-minute oral examination on the practical German language course (examination number: 91834) The coursework is recognised if the grade of the coursework is at least "sufficient".
Credit points and grades	5 credit points are earned in the module. The assessment of the examinations and the calculation of the module grade are regulated in § 10 of the examination regulations. Examination achievements: Creditable coursework: • Written exam on the professional language course German for Engineers, weighting 7 • Oral examination on the practical German course, weighting 3

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Frequency of the programme	The module is offered every semester.
Workload	The module comprises a total student workload of 150 AS (90 contact hours and 60 hours of self-study).
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Ergänzungsmodul

Module number	220000-180 (Version 01)
Module name	Auslandsstudium (Semester abroad)
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: During their studies abroad, students attend courses at the host university that can be thematically assigned to the supplementary modules of the Foundations of Data Science degree programme or cover other in-depth subject areas of the degree programme. The module thus aims to supplement the content and deepen the modules to be completed at Chemnitz University of Technology. In terms of content, the courses chosen at the host university relate to mathematical topics in the field of data science. Participation in the module requires agreements on the content and course of the study abroad programme with the subject coordinator responsible for the exchange at Chemnitz University of Technology. A learning agreement ensures the suitability of the content of the selected courses. Students who complete a semester abroad usually choose this module. Qualification goals: The qualification goals of the module are both in the area of content and in the area of acquiring key qualifications. As far as content is concerned, students can supplement or deepen the content of their modules to be completed at Chemnitz University of Technology, whereby they learn to take a new look at the topics of data science from a foreign educational and research perspective. Students also acquire a broad spectrum of key qualifications. They generally receive their education in a language other than their mother tongue, they learn to express themselves in a foreign language and to write texts in a foreign language, and they also acquire intercultural skills by spending a considerable period of time in a different cultural environment. The module thus qualifies students for work in an international environment.
Forms of teaching	The module consists of courses at the host university in consultation with the subject coordinator responsible for the exchange at Chemnitz University of Technology totalling 20 CP. They will be specified in the Learning Agreement.
Prerequisites for participation (recommended knowledge and skills)	• If you are studying abroad as part of the ERASMUS programme, you can only start if you have successfully completed your first year of study. • other language skills as required by the host university
Applicability of the module	---
Requirements for the awarding of credit points	The fulfilment of the admission requirements for the examination and the successful completion of the module examination are prerequisites for the awarding of credit points. Admission requirement is: • Proof of content and course of study abroad, usually by submitting a transcript of records on the basis of a confirmed Learning Agreement

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Module examination	The module examination consists of one examination: • 15-minute oral examination on the content and course of the study abroad programme on the basis of proof of the content and course of the study abroad programme, usually the Transcript of Records on the basis of a confirmed Learning Agreement (examination number: I_B_FD-0001)
Credit points and grades	20 credit points are earned in the module. The assessment of the examination performance and the formation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the programme	The module is offered every semester.
Workload	The module comprises a total student workload of 600 AS.
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Language module

Module number	136004-008 (Version 02)
Module name	Deutsch als Fremdsprache IV (Niveau B2) (German as a Foreign Language IV (Level B2))
Responsible for the module	Subject group leader of German as a foreign language at the Centre for Foreign Languages
Contents and qualification goals	Contents: • Practice of all language skills such as listening, speaking, reading and writing based on numerous general language topics, e.g. travelling, holidays, life abroad, school education, topics about intercultural relationships, but also study and work-related facts and situations • Consolidation and expansion of grammatical structures through exercises on nominal statements and declarative sentences, passive constructions, subjunctive I and subjunctive II • Writing application documents The course is based on language competence level B2 of the Common European Framework of Reference for Languages (CEFR). Qualification goals: • Understanding the main content of complex texts on concrete and abstract topics • spontaneous and fluent communication • Clear and detailed statements on a wide range of topics • Explaining your own position on current issues Completion of the module corresponds to language proficiency level B2 of the Common European Framework of Reference for Languages (CEFR).
Teaching methods	The teaching form of the module is the exercise. • Exercise: Course 4 (4 LVS)
Prerequisites for participation (recommended knowledge and skills)	Completion of previous course 3 or placement test (qualification recommendation)
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: Creditable coursework: • 90-minute written examination for course 4 (examination number: 91806) The coursework is recognised if the grade of the coursework is at least "sufficient".
Credit points and grades	5 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every semester.
Workload	The module comprises a total student workload of 150 AS (60 contact hours and 90 hours of self-study).
Duration of the module	In the regular course of study, the module lasts one semester.

Appendix 2: Module description for the English-language degree programme Foundations in Data Science with a Bachelor of Science degree

Language module

Module number	136004-009 (Version 02)
Module name	Deutsch als Fremdsprache V (Niveau C1) (German as a Foreign Language V (Level C1))
Responsible for the module	Subject group leader of German as a foreign language at the Centre for Foreign Languages
Contents and qualification goals	Contents: • Communicative situations and tasks on intercultural topics and on study- and career-related issues and situations • Teaching the differences between oral and written communication • Consolidation of the grammatical forms of the subjunctive I and subjunctive II, functional verb phrases, indicative clauses and nominal statements in German, variants of the subjective use of modal verbs The course is based on language competence level C1 of the Common European Framework of Reference for Languages (CEFR). Qualification goals: • Extensive confidence in coping with linguistic demands: Understanding a wide range of demanding longer texts and grasping their implicit meanings • spontaneous and fluent verbal expression • clear, structured and detailed utterances on complex topics and appropriate use of various means of linking texts • effective and flexible use of the language in social and professional life or in training and studies Completion of the module corresponds to language proficiency level C1 of the Common European Framework of Reference for Languages (CEFR).
Teaching methods	The teaching form of the module is the exercise. • Exercise: Course 5 (4 LVS)
Prerequisites for participation (recommended knowledge and skills)	Completion of previous course 4 or placement test (qualification recommendation)
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: Creditable coursework: • 90-minute written examination for course 5 (examination number: 91807) The coursework is recognised if the grade of the coursework is at least "sufficient".
Credit points and grades	5 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every semester.
Workload	The module comprises a total student workload of 150 AS (60 contact hours and 90 hours of self-study).
Duration of the module	In the regular course of study, the module lasts one semester.

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Language module

Module number	136004-001 (Version 02)
Module name	Deutsch als Fremdsprache – Fachkommunikation I (Niveau C1) (German as a Foreign Language – Specialist Communication I (Level C1))
Responsible for the module	Subject group leader of German as a foreign language at the Centre for Foreign Languages
Contents and qualification goals	Contents: • Focus on teaching word formation models as well as expanding and deepening specialised vocabulary in the context of selected interdisciplinary topics • Overview of forms of the target language with reference to study and work-related situations The course is based on language competence level C1 of the Common European Framework of Reference for Languages (CEFR) and includes a specialised language component. Qualification goals: • Linguistic mastery of study and work-related situations • Confidence in the oral and written use of specialised language • Ability to analyse and interpret country- and culture-specific circumstances Completion of the module corresponds to language competence level C1 of the Common European Framework of Reference for Languages (CEFR) with a technical language orientation.
Teaching methods	The teaching form of the module is the exercise. • Tutorial: Specialised Communication I (4 LVS)
Prerequisites for participation (recommended knowledge and skills)	Proof of level B2 of the Common European Framework of Reference for Languages (CEFR) or placement test (qualification recommendation)
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: Creditable coursework: • 90-minute written exam on specialised communication I (examination number: 91810) The coursework is recognised if the grade of the coursework is at least "sufficient".
Credit points and grades	5 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the programme	The module is usually offered every semester.
Workload	The module comprises a total student workload of 150 AS (60 contact hours and 90 hours of self-study).
Duration of the module	In the regular course of study, the module lasts one semester.

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Language module

Module number	136004-002 (Version 02)
Module name	Deutsch als Fremdsprache – Fachkommunikation II (Niveau C1) (German as a Foreign Language – Specialist Communication II (Level C1))
Responsible for the module	Subject group leader of German as a foreign language at the Centre for Foreign Languages
Contents and qualification goals	Contents: • Teaching and training of language standards for presentations (activity, company, product presentations, case studies) and meetings (meetings, discussions) • Telephoning • Linguistic basics of study and subject-related texts (business letters) The course is based on language competence level C1 of the Common European Framework of Reference for Languages (CEFR) and includes a specialised language component. Qualification goals: • Confidence in oral presentations, ability to participate actively and appropriately in discussions • Confidence in recognising, analysing and writing texts relevant to your studies and profession Completion of the module corresponds to language competence level C1 of the Common European Framework of Reference for Languages (CEFR) with a technical language orientation.
Teaching methods	The module consists of tutorials and tutorials. • Tutorial: Specialised Communication II (4 LVS) • Tutorial (1 LVS)
Prerequisites for participation (recommended knowledge and skills)	Proof of level B2 of the Common European Framework of Reference for Languages (CEFR) or placement test (qualification recommendation)
Applicability of the module	---
Requirements for the awarding of credit points	The fulfilment of the admission requirements for the individual examinations and the successful completion of the module examination are prerequisites for the award of credit points. Admission requirement for the written examination on Specialised Communication II is: • Examination performance 20-minute performance record (presentation) on Specialised Communication II was assessed as at least "sufficient"
Module examination	The module examination consists of two examinations. The following examinations must be completed: Creditable coursework: • 90-minute written exam on Specialised Communication II (examination number: 91811) • 20-minute performance record (presentation) on Specialised Communication II (examination number: 91812) The coursework is recognised if the grade of the coursework is at least "sufficient".
Credit points and grades	5 credit points are earned in the module. The assessment of the examinations and the calculation of the module grade are regulated in § 10 of the examination regulations. Examination achievements: Creditable coursework:

	• Written exam on Specialised Communication II, weighting 2 (3 CP) • Proof of performance (presentation) on Specialised Communication II, weighting 1 (2 CP)
Frequency of the programme	The module is usually offered every semester.
Workload	The module comprises a total student workload of 150 AS (75 contact hours and 75 hours of self-study).
Duration of the module	In the regular course of study, the module lasts one semester.

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Language module

Module number	136001-004 (Version 02)
Module name	Englisch in Studien- und Fachkommunikation III (Niveau C1) (English in Study and Subject Communication III (Level C1))
Responsible for the module	Head of the English department of the Centre for Foreign Languages
Contents and qualification goals	Content: Consolidation of specialised vocabulary in selected areas and systematic expansion of general vocabulary with reference to study- and career-oriented as well as intercultural issues, leading consultations and discussions, giving presentations; The programme is based on language competence level C1 of the Common European Framework of Reference for Languages (CEFR) and includes a technical language component. Qualification goals: Confidence in the oral and written exchange of information and in oral and written expression, confidence in presentations, acquisition of intercultural competences; Completion of the module corresponds to language competence level C1 of the Common European Framework of Reference for Languages (CEFR) with a technical language orientation.
Teaching methods	The teaching form of the module is the exercise. • Exercise: Course 3 Advanced English in job-related situations (4 LVS)
Prerequisites for participation (recommended knowledge and skills)	Completion of the module English in Academic and Specialised Communication II (level B2) or placement test (qualification recommendation)
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of two examinations. The following examinations must be completed: Creditable coursework: • 120-minute written exam for course 3 (examination number: 91203) • 30-minute oral examination (presentation) for course 3 (examination number: 91225) The coursework is recognised if the grade of the coursework is at least "sufficient".
Credit points and grades	5 credit points are earned in the module. The assessment of the examinations and the calculation of the module grade are regulated in § 10 of the examination regulations. Examination achievements: Creditable coursework: • Written exam for course 3, weighting 4 (4 CP) • Oral examination for course 3, weighting 1 (1 CP)
Frequency of the programme	The module is offered every semester.
Workload	The module comprises a total student workload of 150 AS (60 contact hours and 90 hours of self-study).
Duration of the module	In the regular course of study, the module lasts one semester.

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Language module

Module number	136001-005 (Version 03)
Module name	Englisch in Studien- und Fachkommunikation IV (Niveau C1) (English in Study and Subject Communication IV (Level C1))
Responsible for the module	Head of the English department of the Centre for Foreign Languages
Contents and qualification goals	Content: Consolidation of specialised vocabulary in selected areas and systematic expansion of general vocabulary with reference to study- and career-oriented as well as intercultural issues, leading consultations and discussions, giving presentations including questions and answers, analysis and teaching of text-type-specific features for writing academic texts (academic essays, summaries, project descriptions, motivation letters); The programme is based on language competence level C1 of the Common European Framework of Reference for Languages (CEFR) and includes a technical language component. Qualification goals: Confidence in the oral and written exchange of information and in oral and written expression, confidence in presentations in compliance with formal criteria, acquisition of intercultural competences, achievement of a stylistic range of variation in oral and written expression; Completion of the module corresponds to language competence level C1 of the Common European Framework of Reference for Languages (CEFR) with a technical language orientation.
Teaching methods	The teaching form of the module is the exercise. • Exercise: Course 3 Advanced English in job-related situations (4 LVS) • Tutorial: Course 4 Academic Writing and Speaking (4 LVS)
Prerequisites for participation (recommended knowledge and skills)	Completion of the module English in Academic and Specialised Communication II (level B2) or placement test (qualification recommendation)
Applicability of the module	---
Requirements for the awarding of credit points	The fulfilment of the admission requirements for the individual examinations and the successful completion of the module examination are prerequisites for the award of credit points. The admission requirement is the following preliminary examination (can be repeated indefinitely): • Academic paper (length: 1000-1500 words, workload: 60 AS) in course 4 for the creditable coursework for course 4
Module examination	The module examination consists of three examinations. The following examinations must be completed: Creditable coursework: • 120-minute written exam for course 3 (examination number: 91203) • 30-minute oral examination (presentation) for course 3 (examination number: 91225) • 15-minute oral group discussion for course 4 (examination number: 91219) The coursework is recognised if the grade of the coursework is at least "sufficient".

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Credit points and grades	10 credit points are earned in the module. The assessment of the examinations and the calculation of the module grade are regulated in § 10 of the examination regulations. Examination achievements: Creditable coursework: • Written exam for course 3, weighting 3 (4 CP) • oral examination for course 3, weighting 2 (1 CP) • oral group discussion on course 4, weighting 3 (5 CP)
Frequency of the programme	The module is offered every semester.
Workload	The module comprises a total student workload of 300 AS (120 contact hours and 180 hours of self-study).
Duration of the module	In the regular course of study, the module lasts two semesters.

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Language module

Module number	136001-006 (Version 03)
Module name	Englisch in Studien- und Fachkommunikation V (Niveau C1) (English in Study and Subject Communication V (Level C1))
Responsible for the module	Head of the English department of the Centre for Foreign Languages
Contents and qualification goals	Content: To impart advanced knowledge and skills in the scientific and technical use of the English language with a focus on the linguistic and stylistic requirements of a technical working environment; The programme is based on language competence level C1 of the Common European Framework of Reference for Languages (CEFR) and includes a technical language component. Qualification goals: Professionalisation in the use of English as a scientific language; training and expansion of communicative and interactive skills; confidence in presentations in compliance with formal criteria; achievement of a stylistic range of variation in oral and written expression; Completion of the module corresponds to language competence level C1 of the Common European Framework of Reference for Languages (CEFR) with a technical language orientation.
Teaching methods	The teaching form of the module is the exercise. • Exercise: Course 4 Academic Writing and Speaking (4 LVS)
Prerequisites for participation (recommended knowledge and skills)	Completion of the module English in Academic and Specialised Communication II (level B2) or placement test (qualification recommendation)
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of two examinations. The following examinations must be completed: Creditable coursework: • Written elaboration "Academic Paper" (length: 1,000 to 1,500 characters, processing time: 3 weeks) and subsequent 30-minute oral presentation and defence of the academic paper on a selected topic of the exercise (examination number: 91220) • Oral group discussion (approx. 15 minutes per participant) on the exercise (examination number: 91219) The coursework will be recognised if the grade of the coursework is at least "sufficient".
Credit points and grades	5 credit points are earned in the module. The assessment of the examinations and the calculation of the module grade are regulated in § 10 of the examination regulations. Examination achievements: Creditable coursework: • written elaboration "Academic Paper" and subsequent oral presentation and defence of the academic paper on a selected topic of the exercise, weighting 1 • Oral group discussion on the exercise, weighting 1
Frequency of the programme	The module is offered every semester.

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Workload	The module comprises a total student workload of 150 AS (60 contact hours and 90 hours of self-study).
Duration of the module	In the regular course of study, the module lasts one semester.

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Language module

Module number	136001-007 (Version 02)
Module name	Englisch in Studien- und Fachkommunikation VI (Niveau C1) (English in Study and Subject Communication VI (Level C1))
Responsible for the module	Head of the English department of the Centre for Foreign Languages
Contents and Qualification goals	Content: Independent research, reading and linguistic evaluation of subject-specific texts as well as application in technical discussions; deepening of academic/professional vocabulary in the subject area, leading consultations and discussions in a technical working environment; The programme is based on language competence level C1 of the Common European Framework of Reference for Languages (CEFR) and includes a technical language component. Qualification goals: Independent reception of specialist texts and use of specialist terminology, presentation of subject-specific facts and leading discussions on the subject, professionalisation in the use of English as a scientific language; Completion of the module corresponds to language competence level C1 of the Common European Framework of Reference for Languages (CEFR) with a technical language orientation.
Teaching methods	The teaching form of the module is the tutorial. • T: Course 5 Subject-specific Reading (4 LVS)
Prerequisites for participation (recommended knowledge and skills)	Completion of the module English in Academic and Specialised Communication II (level B2) or placement test (qualification recommendation)
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of one examination: Creditable coursework: • 30-minute oral summary of a specialised text and discussion of the topic as part of three tutorials in course 5 (examination number: 91227) The coursework is recognised if the grade of the coursework is at least "sufficient".
Credit points and grades	5 credit points are earned in the module. The assessment of the examination performance and the calculation of the module grade are regulated in § 10 of the examination regulations.
Frequency of the module	The module is offered every semester.
Workload	The module comprises a total student workload of 150 AS (10 contact hours and 140 hours of self-study).
Duration of the module	In the regular course of study, the module lasts one semester.

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Language module

Module number	136001-011 (Version 01)
Module name	Business English 4 (BE4)
Responsible for the module	Programme coordinator for Business English of the centre for foreign languages
Contents and Qualification goals	Content: In this module, students are familiarised with the structure and conduct of business negotiations. Qualification goals: After successfully completing the module, students will be able to use the knowledge they have acquired in English business language in a targeted and business fluent manner in both oral and written business communication. The successful completion of the module corresponds to the specialised language competence level C1 of the Common European Framework of Reference for Languages.
Teaching methods	Teaching form of the module is the exercise. • Exercise: Business English 4 (BE4) (4 LVS) The course isheld in English language .
Prerequisites for participation (recommended knowledge andskills)	Completion of the Business English modules (BE1 to BE3) or proof of level C1 via recognised certificates or placement test (qualification recommendation)
Applicability of the module	The module is suitablefor all degree programmes with economic orientation.
Prerequisites for the awarding ofcredit points	The fulfilment of the admission requirements for the individual examinations and the successful completion of the module examination are prerequisites for the award of credit points. Admission requirements are the following examination prerequisites (can be repeated indefinitely): • Compilation of a glossary of important terms and expressions in English negotiation language during the semester • Written summary of a negotiation based on a protocol (length: approx. 1 to 2 pages, processing time: approx. 1 week)
Module examination	The module examination consists of two examinations. The following examinations are to be completed: • 90-minute written examination on Business English 4 (BE4) (examination number: 91105) • Creditable coursework: 30-minute oral group examination (dialogue, approx. 15 minutes per student) on Business English 4 (BE4) (examination number: 91111) The coursework is recognised if the grade of the coursework is at least "sufficient".
Credit points andgrades	In the module 5 credit points areacquired. The assessment of the examinations and the calculation of the module grade are regulated in § 10 of the examination regulations. Examination performance: • Written exam on Business English 4 (BE4), weighting 3 - pass required • Creditable academic achievement: oral group examination on Business English 4 (BE4), weighting 2
Frequency of the offering	The module isoffered in every academic year .
Workload	The module comprises a total workload of students of 150 AS.
Duration of the module	In the case of regular course of study the module extends to one semester.

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Bachelor thesis module

Module number	220000-190 (Version 01)
Module name	Bachelor-Arbeit (Bachelor's Thesis)
Responsible for the module	Dean of Studies for all degree programmes in the Faculty of Mathematics (except Data Science, MINT, Advanced and Computational Mathematics degree programmes)
Contents and qualification goals	Contents: As part of the module, a Bachelor's thesis - a written mathematical paper prepared according to scientific principles - is prepared and defended in a colloquium. The topic should be presented in detail and comprehensibly using a scientific typesetting system such as LaTeX. The results of the Bachelor's thesis must be presented in a lecture and then discussed. The task is assigned by the examination board on the recommendation of a supervising university lecturer from the Faculty of Mathematics. Alternatively, a task from professional practice can be worked on, which was prepared, for example, as part of a voluntary work placement. In this case, the task must be agreed with the supervising university lecturer from the Faculty of Mathematics. Sufficient reference to the mathematical content of the degree programme must be ensured. Qualification goals: Students will be able to work on an assigned topic independently and within a limited period of time using scientific methods. They master the scientific methods and procedures required for this, apply them correctly, modify these methods and procedures if necessary and develop them further if required. Alternative approaches are critically compared. Students write up their results in a clearly structured and academically appropriate form in their thesis.
Teaching methods	The teaching form of the module is the colloquium. • K: Colloquium on the Bachelor's thesis (2 LVS)
Prerequisites for participation (recommended knowledge and skills)	none
Applicability of the module	---
Requirements for the awarding of credit points	Successful completion of the module examination is a prerequisite for the award of credit points.
Module examination	The module examination consists of two examinations. The following examinations must be completed: • Bachelor's thesis (length: approx. 30 pages, completion time: 18 weeks, 36 weeks for part-time students) (examination number: I_B_FD-9110) • 45-minute oral examination (30-minute presentation in the colloquium and 15-minute discussion) on the Bachelor's thesis (examination number: I_B_FD-9120) The examinations can be taken in German or English.
Credit points and grades	15 credit points are earned in the module. The assessment of the examinations and the calculation of the module grade are regulated in § 10 of the examination regulations. Examination achievements: • Bachelor's thesis, weighting 2 - pass required • Oral examination (presentation in colloquium and discussion) on the Bachelor's thesis, weighting 1 - pass required
Frequency of the programme	The module is offered every academic year.
Workload	The module comprises a total student workload of 450 AS.

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Duration of the module	In the regular course of study, the module lasts one semester.