UNIVERSITÄT KLAGENFURT

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Curriculum

for the Master's degree programme in Mathematics

Programme code L 066 401
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Curriculum for the Master's degree programme in Mathematics

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Section 1 General remarks

(1) The Master's degree programme in Mathematics is equivalent to 120 ECTS credits. This equates to an anticipated study duration of four semesters. The Master's degree programme in Mathematics is assigned to the group of engineering science programmes of study pursuant to Section 54 (1) of the Universities Act 2002 (UG).

(2) The workload for the individual course units is indicated in ECTS credits; the workload for one year should amount to 1,500 hours, for which 60 ECTS credits are awarded (Section 54 (2) UG). The workload comprises independent study as well as the semester hours/contact hours, including participation in assessment procedures.

(3) The Master's degree programme in Mathematics is taught in English.

Section 2 Competency profile

(1) The competency profile describes the academic and professional qualifications that students gain by completing the degree programme.

(2) The Master's degree programme in Mathematics builds on the Bachelor's degree programme in Technical Mathematics or a comparable Bachelor's degree programme and deepens students' knowledge and understanding of (applied) mathematics and statistics.

The research-informed degree programme provides students with the skills they need to pursue careers in technology, management and business, for which it is increasingly necessary to master a wide range of mathematical methods. The Master's degree programme also equips students to work in the areas of science and research.

A key learning objective of the Master's degree programme is for students to develop wide and sound knowledge of mathematical methods and tools. Graduates are able to comprehend the formal and mathematical structures of problems in practice and to use mathematical modelling to devise problem-solving strategies. They are also capable of applying and developing the problem-solving strategies and algorithms learnt during the Master's degree programme.

The Master's degree programme gives students the choice to specialise in the following three fields:

- Applied Analysis
- Applied Statistics
- Discrete Mathematics

Before specialising, all students cover the fundamental aspects of all three fields.

A key element of the application-oriented course content is the internship lasting several weeks in an Austrian or international business, a public administrative office, a non-profit organisation or a non-university or university research institution, giving students the chance to try out and apply the skills they have gained.

The opportunity to study the extension elective Informatics and Information and Communications Engineering gives mathematicians educated at the University of Klagenfurt an additional application-oriented qualification. This provides graduates with an introduction to interdisciplinary collaboration in the technical subjects offered at the University of Klagenfurt. The actual opportunities for interdisciplinary cooperation open to graduates on completion of the Master's degree programme in Mathematics is much wider and ranges from technology to natural and biological sciences and the economic and financial sector.

This course gives graduates the sound skills needed to pursue a career in the finance and insurance industry, technology companies, consulting, the medical and pharmaceutical industry and in research and post-secondary educational institutions. The strong practical component of the Master's degree programme, which builds on its broad and in-depth scientific foundations, further improves graduates' career prospects. The Master's degree programme in Mathematics also prepares students for a Doctoral programme in Mathematics or Statistics as well as technical and scientific subjects in general.

After completing the degree programme, students are able to abstract problems that occur in practice, formulate mathematical models for these problems, examine them using the techniques they have learnt and discuss the solutions they develop in an interdisciplinary context. They can perform analyses, simulations and evaluations and implement results using modern symbolic and numerical tools. In terms of the academic sector, the degree programme familiarises students with modern mathematical methods so that they can tackle current topics of research.

Section 3 Admission requirements

(1) Students are eligible to study a Master's degree programme if they have successfully completed a relevant Bachelor's degree programme, a relevant university of applied sciences Bachelor's degree programme or another equivalent programme at a recognised Austrian or international post-secondary educational institution (Section 64 (3) UG).

Examples of relevant courses include the Bachelor's degree programme in (Technical) Mathematics at the University of Klagenfurt, the universities of Graz, Innsbruck, Linz, Salzburg and Vienna and the technical universities of Graz and Vienna.

(2) Since the Master's degree programme is taught in English, proof must be provided of English language ability at level B2 of the Common European Framework of Reference for Languages. Evidence of having studied English and having passed the subject in the last year of a higher education school (provided in the form of an Austrian certificate ("Jahresabschlusszeugnis") of the final school year at a higher education school) is always sufficient proof of proficiency. Proof can also be provided in the form of one of the following internationally recognised certificates: TOEFL iBT (at least 87 points), IELTS (overall band score of at least 6.5), English First Certificate (FCE), Cambridge Advanced English CAE (level B2 certificate). Applicants whose native language is English or who can prove their

English skills as a result of having studied a degree programme in English may be exempt from providing this proof of proficiency.

Section 4 Degree

Graduates of this Master's degree programme will be awarded the academic title "Diplom-Ingenieurin/Diplom-Ingenieur" (shortened to "Dipl.-Ing." or "DI"). If this title is used, it must be placed before the graduate's name.

Section 5 Structure and organisation of the degree programme / Intended learning outcomes

Table 1: Structure of the Master's degree programme

Subject	Designation		Intended learning outcomes	ECTS credits
Compulsory subjects	1	Analysis	After successfully completing the subject, students are able to define and present key concepts and theorems in the area of functional analysis (Riesz theory, Fredholm theory, Spectral theory) Dynamical Systems 1 (notion and examples of dynamical systems, attractors and limit sets, linear dynamical systems, linearization, Poincaré-Bendixson theory (if time permits)) and Partial Differential Equations 1 (existence, uniqueness and properties of solutions, classical and weak theory), to provide and explain proofs for these theorems, to select and adapt them for different areas of application and to combine them with different branches within and outside of mathematics.	12
	2	Discrete Mathematics	After successfully completing the subject, students are able to define and present key concepts and theorems in the area of algebra (group actions, structure of finitely generated abelian groups, Sylow theorems, solvable groups, field extensions, Galois theory) and integer programming (Polyeder theory, unimodularity, relaxations, branch and bound, cutting planes, column generation, matroids), to provide and explain proofs for these theorems, to select and adapt them for different areas of application and to combine them with different branches within and outside of mathematics.	10
	3	Statistics and Probability	After successfully completing the subject, students are able to define and demonstrate key concepts and theorems in the areas of stochastic processes (Martingale in discrete time, Martingale in continuous time, Brownian Motion, Poisson Process, Compound Poisson Process, simulation of stochastic processes) and Bayesian Statistics (count data and proportion analyses, regression analyses of normally distributed and non-normally distributed data, model-based prediction, model comparison and model selection, Priors and loss functions, selected (Markov chain) Monte Carlo methods), to provide and explain proofs for these theorems, to select and adapt them for different areas of application and to combine them with different branches within and outside of mathematics.	10

	One of the following specializations (Focus Subjects):			
Guided electives	4	Specialization: Applied Analysis	After successfully completing the subject, students are able to define and present key concepts and theorems in the chosen sub-areas (Dynamical Systems 1: notion and examples of dynamical systems, attractors and limit sets, linear dynamical systems, linearization, Poincaré-Bendixson theory (if time permits); Dynamical Systems 2: continuation of Dynamical Systems 1; inverse problems: examples of inverse problems, regularization methods, convergence analysis; Mathematical Methods in Continuum Mechanics: deformations, displacements, conservation laws, equation of motion; Nonlinear Analysis: local (differentiability notions in normed spaces, implicit and inverse function theorems) and global (topological and monotonicity tools) theory, applications to differential and integral equations; Numerics of Partial Differential Equations: finite element approximation of elliptic problems, numerical time integration; Partial Differential Equations 1: existence, uniqueness and properties of solutions, classical and weak theory; Partial Differential Equations 2: time dependent problems, Hamilton-Jacobi equations, semigroup theory), to provide and explain proofs for these theorems, to select and adapt them for different areas of application and to combine them with different branches within and outside of mathematics. After successfully completing the subject, students are further able to acquire knowledge of a chosen mathematical topic independently, to conduct literary research independently, to work independently with mathematical texts and to formulate mathematical thought processes independently.	24
	5	Discrete Mathematics	After successfully completing the subject, students are able to define and present key concepts and theorems in the chosen sub-areas of Discrete Mathematics (algebraic curves: Riemann-Roch theorem, elliptic curves; Algorithms and Complexity: complexity classes, approximation algorithms, probabilistic algorithms; Combinatorial Optimization: tree and matching enumeration, linear assignment problems, interval graphs, approximation, rounding; Combinatorics: Polya theory, sieve methods, Möbius inversion, random graphs, Ramsey theory; Mathematical Analysis of algorithms: generating functions, Mellin transform methods, singularity analysis, saddle point method), to provide and explain proofs for these theorems, to select and adapt them for different areas of application and to combine them with different branches within and outside of mathematics. After successfully completing the subject, students are further able to acquire knowledge of a chosen mathematical topic independently, to conduct literary research independently, to work independently with mathematical texts and to formulate mathematical thought processes independently.	24

	6	Specialization: Statistics and Probability	After successfully completing the subject, students are able to define and demonstrate key concepts and theorems in the areas of Probability (Martingale in continuous time, stochastic integration theory, Itô formula, strong and weak solutions of stochastic differential equations, existence and uniqueness of solutions of stochastic differential equations, explicit solution of stochastic differential equations, Monte Carlo, variance reduction methods, construction of Brownian paths, numerical methods for solving stochastic differential equations, convergence analysis, Multilevel Monte Carlo, financial markets and financial products, financial mathematics, no-arbitrage principle, Black-Scholes model, pricing of financial products, numerical solution of the Black-Scholes PDE, dynamic programming, Feynman-Kač formula, stochastic regulator problem, portfolio optimisation problem, numerical solution of control problems, stochastic optimisation methods, applications of stochastic optimisation in machine learning, neural networks and simulation methods for solving SDEs, PDEs, BSDEs) and of Statistics (Bayesian Computing: numerical inference and prediction methods such as Importance and Rejection Sampling, Metropolis-Hastings methods, Gibbs Sampling, Data Augmentation, Particle Filtering; Financial Econometrics: univariate and multivariate time series models such as (Vector-)Auto-regressions, (G)ARCH processes, Stochastic Volatility models; Spatial Statistics: Modelling and Estimation in Geostatistics, Statistics of Areal Data, Point Processes; Statistical Learning: Probabilistic Models for Discrete and Continuous Data, Latent and Sparse Linear Models, Graphical Models), to provide and explain proofs for these theorems, to select and adapt them for different areas of application and to combine them with different branches within and outside of mathematics. After successfully completing the subject, students are further able to acquire knowledge of a chosen mathematical topic independently, to conduct literature research independently, to work independently with mathematical texts and to formulate mathematical thought processes independently.	24
		One of the following Extension Subjects:		
	7	• Applied Mathematics • Artificial Intelligence and Cybersecurity • Feminist Science / Gender Studies • Informatics • Information and Communications Engineering • Sustainable Development	After successfully completing the subject, students are able to explain and apply more in-depth knowledge and methods from the chosen extension subject according to their own interests.	12
Open electives	8		The students acquire individually chosen further competences	9

Internship	9		After successfully completing the subject, students are able to define, plan, implement, document and present a given problem from the field of research, industry and science and to reflect on the solution process.	14
Master's thesis	10		After successfully completing the subject, students are able to research, present, summarise and apply the latest scientific and technological knowledge in a sub-area of mathematics and in the areas in which this domain is applied, to compare and question various approaches and to devise, implement and validate solutions.	24
Research seminar	11			2
Final Board Examination	12			3
			Total (ECTS credits):	**120**

Section 6 Semester abroad/mobility

(1) It is highly recommended for all students of the Master's degree programme to complete a period of study abroad within the framework of their degree programme. In particular, students are advised of the possibility to complete an internship abroad. Transnational EU, state or university mobility programmes can be used for this purpose. Examinations and other academic achievements completed within the scope of a period of study abroad can be recognised in accordance with the provisions pursuant to § 78 UG in lieu of examinations and academic achievements prescribed in the curriculum. The 2nd or 3rd semester is the recommended mobility window.

(2) Upon application by regular students who wish to pursue sections of their studies abroad, an official decision shall be issued in advance to determine which of the proposed examinations and other academic achievements may be recognised (§ 78 para. 5 UG). In any case, interested students are urged to contact the respective competent Programme Director in advance with regard to the possible and intended recognition.

Section 7 Types of courses

(1) Lectures (LE) are courses in which knowledge is transferred by means of talks given by lecturers.

(2) Courses with ongoing assessment are courses in which the assessment does not take place as a one-off examination, but on the basis of written and/or oral contributions by the participants. If, in the framework of a course with ongoing assessment, a seminar paper or an assignment requiring a comparable degree of effort is to be written, assignments/papers for courses taking place in the winter semester can be handed in up until the following 30 June; papers for courses taking place in the summer semester can be handed in up until 31 January of the following year.

Courses with ongoing assessment comprise (incl. German abbreviations):

(a) Exercise Class (UE)

Exercise classes are courses in which students practise and consolidate theoretical knowledge by working on concrete tasks and solving problems.

(b) Lab (PR)

During labs, students are required to work on specific practical problems, sometimes in work groups. The development of teamwork skills is taken into account during this element of the degree programme. The course concludes with a paper on the practical work and a presentation based on this paper.

(c) Lecture with Exercise (VU)

A lecture with an exercise consists of a lecture part and an exercise part, which are closely linked in terms of the teaching methods used and are assessed jointly.

(d) Seminar (SE)

Seminars are used for academic discussion. Students are expected to make their own active contributions. The seminar concludes with a seminar paper and a presentation based on this paper.

(e) Research Seminar (PV)

The purpose of the research seminar is to provide ongoing supervision and quality assurance to students as they write their Master's thesis.

With regard to courses taken from other programmes, the definitions of course types found in the respective curricula apply.

Section 8 Compulsory subjects

Compulsory subjects are subjects significant to the degree programme and for which examinations must be taken. The courses in the compulsory subjects comprise 32 ECTS credits and are listed in the following table:

Table 2: Compulsory subjects

	Course designation		Course type	S.h.	ECTS credits
Analysis	1.1	Dynamical Systems 1	VO+UE	2+0.5	3+1
	1.2	Functional Analysis	VO+UE	2+0.5	3+1
	1.3	Partial Differential Equations 1	VO+UE	2+0.5	3+1
Discrete Mathematics	2.1	Algebra	VO+UE	2+1	3+2
	2.2	Integer Optimization	VO+UE	2+1	3+2
Statistics and Probability	3.1	Bayesian Statistics	VO+UE	2+1	3+2
	3.2	Stochastic Processes	VO+UE	2+1	3+2
				Total (ECTS credits):	**32**

Section 9 Guided electives

(1) Guided electives are subjects that students are able to select according to the regulations of the curriculum. A total of 36 ECTS credits must be obtained from guided electives.

The guided electives can be divided into

- a focus subject (24 ECTS credits) and
- an extension subject (12 ECTS credits).

(2) Students are required to choose one of the following focus subjects:

- Applied Analysis
- Discrete Mathematics
- Statistics and Probability

Students are required to complete courses worth 24 ECTS credits in their chosen focus subject from the list found in Table 3. As part of this, students have the opportunity to select courses worth up to a total of 6 ECTS credits from other focus subjects. One seminar must always be chosen.

(3) Students are required to choose one of the following extension subjects:

- Applied Mathematics
- Artificial Intelligence and Cybersecurity
- Feminist Science / Gender Studies
- Informatics
- Information and Communications Engineering
- Sustainable Development

Students must complete courses from the chosen extension subject amounting to 12 ECTS credits. Within this framework, it is possible to select courses totalling a maximum of 4 ECTS credits from other extension subjects. Details on the extension subjects can be found in Table 4. Please note that it is not possible to assign an examination more than once within a degree programme.

(4) *The guided electives can be found in the following tables:*

Table 3: Focus Subjects (24 ECTS credits)

		Course code	Course type	S.h.	ECTS credits
Applied Analysis	4.1	Dynamical Systems 2	VO+UE	2+1	4+2
	4.2	Inverse Problems	VO+UE	2+1	4+2
	4.3	Mathematical Methods in Continuum Mechanics	VO+UE	2+1	4+2
	4.4	Nonlinear Analysis	VO+UE	2+1	4+2
	4.5	Numerics of Partial Differential Equations	VO+UE	2+1	4+2
	4.6	Partial Differential Equations 2	VO+UE	2+1	4+2
	4.7	Selected Topics in Analysis	VO+UE	2+1	3+2
	4.8	Selected Topics in Numerics	VO+UE	2+1	3+2
	4.9	Numerics Lab	PR	1	3
	4.10	Seminar in Analysis	SE	2	4
Discrete Mathematics	5.1	Algebraic Curves	VO+UE	3+1	6+2
	5.2	Algorithms and Complexity	VO+UE	2+2	2+4
	5.3	Combinatorial Optimization	VO+UE	2+1	4+2
	5.4	Combinatorics	VO+UE	2+1	4+2
	5.5	Mathematical Analysis of Algorithms	VO+UE	2+1	4+2
	5.6	Selected Topics in Algebra and Number Theory	VO+UE	2+1	3+2
	5.7	Selected Topics in Discrete Mathematics	VO+UE	2+1	3+2
	5.8	Selected Topics in Optimization	VO+UE	2+1	3+2
	5.9	Symbolic Computation Lab	PR	1	3
	5.10	Seminar in Discrete Mathematics	SE	2	4
Statistics and Probability	6.1	Bayesian Computing	VU	3	4.5
	6.2	Financial Econometrics	VO+UE	2+1	4+2
	6.3	Financial Mathematics	VO+UE	2+1	3+2
	6.4	Spatial Statistics	VO+UE	2+1	3+2
	6.5	Numerics for Stochastic Differential Equations	VO+UE	2+1	3+2
	6.6	Statistical Learning	VU	3	4.5
	6.7	Stochastic Differential Equations	VO+UE	2+1	4+2
	6.8	Stochastic Optimization	VO+UE	2+1	3+2
	6.9	Selected Topics in Statistics	VO+UE	2+1	3+2
	6.10	Selected Topics on Stochastic Processes	VO+UE	2+1	3+2

	6.11	Statistics Lab	PR	1	3
	6.12	Seminar in Statistics and Probability	SE	2	4

Table 4: Extension subjects (12 ECTS credits)

			ECTS credits
Applied Mathematics	7.1	Choice of further courses from the focus subjects.	12
Artificial Intelligence and Cybersecurity	7.2	Selection of subject-related courses from the Master's degree programme in "Artificial Intelligence and Cybersecurity".[1]	12
Feminist Science / Gender Studies	7.3	Courses from the range offered within "Feminist Science / Gender Studies".	12
Informatics	7.4	Choice of subject-related courses from the Master's degree programme in "Informatics".[1]	12
Information and Communications Engineering	7.5	Choice of subject-related courses from the Master's degree programme in "Information and Communications Engineering".[1]	12
Sustainable Development	7.6	Elective Sustainable Development I-III	12

[1] Students can only choose courses from the respective other Master's curriculum if the content clearly exceeds the content of the courses included in the compulsory subjects and focus subjects of the Master's curriculum in Mathematics. It is recommended to complete courses that build on each other in the scheduled order. A list of precedents can be found at: https://www.math.aau.at/Erweiterungsfaecher-MA.

Section 10 Open electives

(1) Open electives are courses that can be freely chosen from a range of different course offerings at recognised Austrian or international universities. Courses that the student completed in order to be entitled to study or to gain general or special eligibility for university admission are excluded from this.

(2) In the case of courses that have been completed at other recognised domestic or foreign post-secondary educational institutions, the competent Programme Director will decide whether the recognition as open electives makes sense academically or with regard to professional activities for the chosen programme of study.

(3) Students are required to complete open electives amounting to 9 ECTS credits.

Section 11 Courses with a limited number of participants

(1) The maximum number of participants permitted on each of the following courses is as follows:

- Exercise Class: 25
- Exercise part in Lecture with Exercise: 25
- Lab: 15
- Seminar: 15

For courses from other curricula, the maximum numbers found in the respective curricula apply.

(2) If the number of applications for these courses exceeds the number of places available, students will be accepted in accordance with the following procedure:

(a) Students whose curriculum stipulates the course in question as a compulsory subject or as a guided elective are given priority admission.

(b) In the event that the number of registrations still exceeds the number of places available, the ranking will be based on the ECTS credits already acquired in the curriculum that defines the course in question as a compulsory subject or guided elective. A higher total amount will be ranked preferentially.

Section 12 Master's thesis

(1) The Master's thesis is the academic paper that demonstrates the student's ability to achieve adequate standards of content and methodology when independently addressing scholarly topics. The assignment for the Master's thesis will be chosen in such a way that it is reasonable to expect a student to complete it within six months. A number of students may jointly address a topic, provided that the performance of individual students can be assessed.

(2) The topic to be covered in the Master's thesis must be chosen from one of the following subjects:

- Analysis
- Discrete Mathematics
- Statistics and Probability

(3) The Master's thesis is worth 24 ECTS credits and the associated research seminar carries 2 ECTS credits.

(4) According to Statute B § 18 Para. 4 and 2a, the topic and the supervisor of the Master's thesis must be approved by the Rector of Studies. The application must be submitted before work commences. A change of supervisor is permitted until the time of submission of the Master's thesis. In justified individual cases (interdisciplinary focus of the topic), supervision by two persons who are authorised to supervise is permissible.

(5) The completed Master's thesis must be submitted to the Rector of Studies in electronic format. On the request of the supervisor, the author must provide them with a bound copy of the thesis. The supervisor has two months from the date of submission to assess the Master's thesis.

Section 13 Provisions on the completion of a relevant internship

(1) Students are required to complete an internship in a domestic or foreign business, in public administration, a non-profit organisation or a non-university research institution in order to try out and apply in practice the skills they have gained. The internship may also be completed at a university research institute. The internship must amount to 280 hours. Students are also required to submit an internship report and give an internship presentation. The internship, including the internship report and presentation, is worth 14 ECTS credits.

(2) Students must inform their supervising university teacher of their choice of internship in advance, who must then approve it. The Programme Director must agree with the supervising university teacher's decision to approve the internship. Students are recommended to complete the internship during the second or third semester of study.

(3) After the internship and no later than during the following semester, students are required to write an internship report and to give a presentation about the internship. This is necessary in order for the internship to be deemed to have been successfully completed.

Section 14 Use of languages other than English

The courses and oral and written examinations for the Master's degree programme in Mathematics will be held and taken in English; the Master's thesis must be written in English. Individual courses defined in other curricula as well as corresponding oral and written examinations may be conducted in German.

Section 15 Examination regulations

(1) To graduate from the Master's degree programme in Mathematics, students are required to successfully complete the following course components:

a) the courses for the compulsory subjects, guided electives and open electives (Sections 8–10),

b) the Master's thesis and the associated research seminar according to Section 13,

c) the internship according to Section 14 and

d) the final board examination according to Para. 4.

(2) The prerequisite for applying for the final board examination is the completion of the parts listed under Para. 1, points a–c.

(3) The research seminar according to Section 13 and the internship according to Section 14 are assessed as being either “successfully completed” or “unsuccessfully completed”.

(4) The final board examination takes the form of an oral examination that generally lasts for one hour and is taken in front of an examination board comprising three people. The final board examination is worth 3 ECTS credits and includes the following:

a) a presentation and defence of the Master’s thesis (1 ECTS credit);

b) an examination on a branch of the subject from which the topic of the Master’s thesis was taken, see Section 13, Para. 2 (1 ECTS credit);

c) an examination on a further branch, which can be chosen from the subjects of Analysis, Discrete Mathematics, Statistics and Probability, Artificial Intelligence and Cybersecurity, Informatics or Information and Communications Engineering (1 ECTS credit).

(5) Examinations for lecture courses take place at or following the end of the lectures in the form of a single (written and/or oral) examination.

(6) All other types of courses are based on continuous assessment. Attendance is mandatory. Moreover, students are expected to actively participate in the discussion and reflection process as well as examinations, written papers and/or oral presentations.

(7) In accordance with the Statute, the lecturer responsible for the course must inform the students about the respective examination and assessment modalities of the course before the beginning of each semester.

(8) The provisions of the Statute of the University of Klagenfurt and the Universities Act, as amended from time to time, shall apply with regard to the administration and repetition of examinations.

(9) Examinations that have already been used for the completion of studies regarded as prerequisites for admission cannot be used again to complete the programme of studies in the Master’s degree programme.

Section 16 Effective validity

This curriculum will enter into force on 1 October 2022 following announcement in the University Bulletin of the University of Klagenfurt and will apply to all students who commence their Master’s degree programme from the 2022/23 winter semester onwards.

Section 17 Transitional provisions

Students who, at the time this curriculum version 22W.1 comes into force, are subject to the Master's curriculum Mathematics version 18W in force prior to the enactment of this curriculum, are entitled to complete their studies according to the provisions of the curriculum version 18W within 5 semesters. If the degree programme is not completed by 31 March 2025, students shall be bound by the curriculum for the Master's degree programme in Mathematics as applicable at that time.

Students following the previously valid curriculum are entitled to transfer to the newly valid curriculum at any time.

APPENDIX 1 Equivalence table

The specific provisions on the equivalence of examinations of the previously applicable and the amended curriculum can be found in Appendix 1 (equivalence table).

Master's degree programme in Mathematics, version 22W.1, enacted in University Bulletin special issue 21, No.101.5 dated 29.06.2022			**Master's degree programme in Mathematics, version 18W, enacted in University Bulletin, issue 14, No. 92.4 dated 18.04.2018**		
Course	**Course type**	**ECTS credits**	**Course**	**Course type**	**ECTS credits**
1.1 Dynamical Systems 1 1.2 Functional Analysis 1.3 Partial Differential Equations 1	VO+UE VO+UE VO+UE	3+1 3+1 3+1	Functional Analysis	VO+UE	6+4
2.1 Algebra	VO+UE	3+2	2.1 Algebra	VO+UE	3+2
2.2 Integer Optimization	VO+UE	3+2	2.2 Integer Optimization	VO+UE	3+2
3.1 Bayesian Statistics	VO+UE	3+2	Statistical Decision Theory or Bayesian Statistics	VO+UE VO+UE	3+2 4+2
3.2 Stochastic Processes	VO+UE	3+2	3.2 Stochastic Processes	VO+UE	3+2
13 Internship	PV	14	Internship	PR	15
15 Research Seminar	PV	2	Research Seminar	PV	3
Successfully completed courses from the guided electives according to § 9 of the Master's degree programme in Mathematics (version 18W) shall be fully recognised in lieu of the respective guided elective of the Master's degree programme in Mathematics (version 22W.1).					

APPENDIX 2 Non-binding recommended course of study

Designation	1st semester	2nd semester[1]	3rd semester	4th semester
1.1 Dynamical Systems 1	4			
1.2 Functional Analysis	4			
1.3 Partial Differential Equations 1		4		
2.1 Algebra	5			
2.2 Integer Optimization		5		
3.1 Bayesian Statistics	5			
3.2 Stochastic Processes		5		
4-6 Focus Subject	12	6	6[2]	
7 Extension Subject		6	6	
Open Electives		5	4	
Internship			14	
Master's Thesis				24
Research Seminar				2
Final Board Examination				3
Total ECTS credits:	**30**	**31**	**30**	**29**

[1] Recommended mobility window

[2] It is recommended to complete the seminar in the 3rd semester within the scope of the specialization.