Assessment plan for the curriculum of the **Bachelor's** degree programme in Mathematics, 2024-2025

Programme director: dr. A.E. (Alef) Sterk

Date advice Board of Examiners: June 5, 2024

Date approval Faculty Board:

1. Vision on assessment

1. Assessment evaluates the student's skills to formulate precise mathematical arguments.
2. Assessment stimulates the student to develop structured approaches to solving mathematical problems using specific concepts.
3. Assessment stimulates the development of both written and oral communication skills in academic and professional contexts.

2. Assessment guidelines

Please explain the general assessment procedures that are used in the programmes. For example, 4-eyes principle in test design, standardised grading forms, rubrics.

1. All summative assessment is organized onsite; formative assessment can be organized either online or onsite.
2. The formative and summative assessment are designed by the course coordinator in such a way that the assessment covers all the intended learning outcomes of the course.
3. Summative assessments in the form of final exams are designed by the course coordinator and are peer reviewed by the second examiner in order to ensure that the exam assesses the course material representatively and sufficiently.
4. When making use of mathematical literature when writing assignments, the student must explain how this literature was used.

3. Learning outcomes of the degree programme

Learning outcomes for the degree programme, further specified learning outcomes (where relevant) and/or specified for tracks within the degree programme. Please add extra rows if necessary.

	Learning Outcome - track General Mathematics *Bachelor's graduates in Mathematics track General Mathematics:*
	Generic learning outcomes – Knowledge
A1	have general knowledge of the foundations and principal branches of mathematics.
A2	have mastered the basic concepts of mathematics (see Appendix I for further specification) to a

	certain extent and are familiar with the interrelationships of these concepts within mathematics as well as with other disciplines (e.g., physics, logic, or philosophy).
A3	have in-depth knowledge of several current topics within mathematics.
A4	are familiar with the quantitative character of mathematics and have an understanding of the methods used in this field.
A5	have sufficient knowledge and understanding of mathematics to successfully complete a follow-up Master's degree programme in Mathematics.
A6	are aware of the societal, ethical and social aspects involved in the field of mathematics.
	Generic learning outcomes – Skills
B1	(Research) are able to draw up a research question, design, plan and conduct research and report on it independently with a certain degree of supervision. Bachelor's graduates are able to evaluate the value and limitations of their research and assess its applicability outside their own field. See Appendix II for further specification.
B2	(Problem Solving) are able to identify, apply, and choose among several potentially appropriate mathematical methods, persist in the face of difficulty, emphasize the importance of clarity and precision, and present solutions that include appropriate justification for their reasoning. See Appendix II for further specification.
B3	(Gathering information) are able to gather relevant information using modern means of communication and to critically interpret this information.
B4	(Collaborating) are able to collaborate intellectually and creatively in diverse contexts, while applying mathematical reasoning as well as emphasizing its importance.
B5	(Communicating) are able to communicate orally and in writing in academic and professional contexts, with both colleagues and others, in English. They are familiar with the relevant means of communication.
B6	(Reflecting) are able to assess their own actions and those of others in a natural sciences context, bearing in mind the social/societal and ethical aspects.
B7	(Learning skills) are able to apply learning skills that enable them to pursue a follow-up degree and acquire knowledge in new fields with a high level of autonomy.
	Specified basic knowledge related learning outcomes
1.1	have mastered the basic concepts and techniques of mathematics, in particular single and multivariable calculus, linear algebra, analysis, ordinary differential equations, probability theory, statistics and algebra.
1.2	have knowledge of more advanced subjects within the fields of algebra, geometry, analysis, numerical mathematics, dynamical systems, probability and statistics.
1.3	have specific knowledge of one of the fields of Pure Mathematics.
1.4	have gained knowledge of and experience in the 'heart' of mathematics, i.e., understand the basic rules of logic, appreciate the role of mathematical proof, proficiently construct logical arguments and rigorous proofs, formulate and solve abstract mathematical problems.

1.5	recognize connections between different branches of mathematics, understand the connections between theory and applications, and have knowledge of various applications of mathematics.
1.6	are able to use mathematical software packages in an effective way or, if necessary, modify programs themselves.
	Degree programme-specific learning outcomes – Skills
	Research
2.1	have an academic attitude, which means they are curious, critical, creative and dare to show initiative.
2.2	are able to formulate relatively simple mathematical questions and problems in an exact way and if necessary, adapt them to make them tractable
2.3	are able to articulate assumptions, understand the importance of detailed definitions, and are able to think in an organized way, to apply exact logical arguments when solving problems, and to generalize and abstract.
2.4	are able to analyse and abstract simple problems that are outside the scope of their own study programme and to independently acquire new knowledge to this end.
	Problem solving
2.5	are able, under supervision and from the perspective of their field of interest, to translate a problem into a relevant mathematical problem definition and to this end formulate and evaluate a solution based on source research.
2.6	are able to distinguish a coherent argument from a fallacious one, make vague ideas precise by formulating them in the mathematical language, recognize real-world problems that are amenable to mathematical analysis, and use fundamental mathematical concepts and methods to study these problems.
2.7	are able to approach mathematical problems on the basis of a certain logical system and with determination to find the right method of approach.
2.8	are aware of the importance of researching specific cases and examples and have the attitude and skills necessary to critically evaluate the solutions found, test them for correctness and interpret them.
2.9	are able, by abstracting and reasoning, to delve into the root of a problem and determine whether existing methods can be applied or new methods must be developed.

	Learning Outcome - track Probability and Statistics *Bachelor's graduates in Mathematics track Probability and Statistics:*
	Generic learning outcomes – Knowledge
A1	have general knowledge of the foundations and principal branches of mathematics.
A2	have mastered the basic concepts of mathematics, probability and statistics (see Appendix I' for further specification) to a certain extent and are familiar with the interrelationships of these concepts within mathematics as well as with other disciplines (e.g., econometrics, life sciences, physics).

A3	have in-depth knowledge of several current topics within mathematics.
A4	are familiar with the quantitative character of mathematics and have an understanding of the methods used in this field.
A5	have sufficient knowledge and understanding of mathematics to successfully complete a follow-up Master's degree programme in Mathematics.
A6	are aware of the societal, ethical and social aspects involved in the field of mathematics.
	Generic learning outcomes – Skills
B1	(Research) are able to draw up a research question, design, plan and conduct research and report on it independently with a certain degree of supervision. Bachelor's graduates are able to evaluate the value and limitations of their research and assess its applicability outside their own field. See Appendix II for further specification.
B2	(Problem Solving, Modelling) are able to identify, apply, and choose among several potentially appropriate mathematical methods, present solutions that include appropriate justification for their reasoning, and are able to translate a problem, in particular a design problem, into a plan of approach and – taking into account the requirements of the client and/or technical preconditions – find a solution. See Appendix II' for further specification.
B3	(Gathering information) are able to gather relevant information using modern means of communication and to critically interpret this information.
B4	(Collaborating) are able to collaborate intellectually and creatively in diverse contexts, while applying mathematical reasoning as well as emphasizing its importance.
B5	(Communicating) are able to communicate orally and in writing in academic and professional contexts, in English, and are able to interact with mathematicians as well with scientists who apply statistical methods. They are familiar with the relevant means of communication.
B6	(Reflecting) are able to assess their own actions and those of others in a natural sciences context, bearing in mind the social/societal and ethical aspects.
B7	(Learning skills) are able to apply learning skills that enable them to pursue a follow-up degree and acquire knowledge in new fields with a high level of autonomy.
	Specified basic knowledge related learning outcomes
1.1	have mastered the basic concepts and techniques of mathematics, in particular single and multivariable calculus, linear algebra, analysis, ordinary differential equations, probability theory and statistics, and algebra.
1.2	have knowledge of more advanced subjects within the fields of algebra, geometry, analysis, numerical mathematics, dynamical systems, probability and statistics.
1.3	have specific knowledge of one of the fields of Pure Mathematics and Statistics.
1.4	have gained knowledge of and experience in precise (both mathematical and statistical) reasoning and mathematical proof.
1.5	recognize connections between different branches of mathematics, recognize the connections between theory and applications, and have knowledge of basic sciences at a level necessary to apply statistical or mathematical methods, and are aware of the wider multidisciplinary context of

	(life) science and engineering.
1.6	are able to use mathematical software packages in an effective way or, if necessary, modify programs themselves.
	Degree programme-specific learning outcomes – Skills
	Research
2.1	have an academic attitude, which means they are curious, critical, creative and dare to show initiative.
2.2	are able to formulate relatively simple mathematical questions and problems in an exact way and if necessary, adapt them to make them tractable
2.3	are able to articulate assumptions, understand the importance of detailed definitions, and are able to think in an organized way, to apply exact logical arguments when solving problems, and to generalize and abstract.
2.4	are able to analyse and abstract simple problems that are outside the scope of their own study programme and to independently acquire new knowledge to this end.
	Problem solving, Modelling
2.5	are able, under supervision and from the perspective of their field of interest, to translate a problem into a relevant mathematical problem definition and to this end formulate and evaluate a solution based on source research.
2.6	are able to make vague ideas precise by formulating them in the mathematical language, recognize real-world problems that are amenable to mathematical/statistical analysis, and are able to discuss the assumptions underlying their mathematical/statistical model, use mathematical/statistical concepts and methods to study these models.
2.7	are able to approach mathematical problems on the basis of a certain logical system and with determination to find the right method of approach and are aware of the limitations of the chosen method.
2.8	are aware of the importance of researching specific cases and examples and have the attitude and skills necessary to critically evaluate the solutions found, test them for correctness and interpret them.
2.9	are able, by modelling, abstracting and reasoning, to delve into the root of a problem and determine whether existing methods can be applied or new methods must be developed.
2.10	are able to conduct searches of literature, to critically use scientific databases and other sources of information, or to consult specialists to carry out statistical and mathematical analysis in order to study problems in (life) science and engineering.

4. Overview of assessment methods, test moments for course units, and examiners

This table shows all the course units for each year of the programme and assessment methods. Please add extra rows if necessary.

Year	**Period**	**Course**	**EC**	**Assessment methods**	**Does (part of the) assessment have a formative function?**	**Test moment(s)** (e.g. mid-term, continuous assessment, exam week, etc)	**First examiner**	**Second examiner**
1	1A	Calculus 1 (WBMA003-05)	5	WE, AST	Yes	Exam week, continuous assessment (homework)	dr. T.F. Görbe	dr. H. Jardón Kojakhmetov
1	1A	Linear Algebra 1 (WBMA020-05)	5	WE, AST	No	Exam week, continuous assessment (homework)	prof. dr. M.K. Camlibel	dr. ir. H.J. van Waarde
1	1A	Sets and Numbers (WBMA051-05)	5	WE	No	Mid-term, exam week	prof. dr. J. Top	prof. dr. R.I. van der Veen
1	1B	Analysis (WBMA012-05)	5	WE, AST	No	Exam week, continuous assessment (homework)	prof. dr. M. Seri	dr. A.E. Sterk
1	1B	Calculus 2 (WBMA029-05)	5	WE, AST	No	Mid-term, exam week, continuous assessment (homework)	prof. dr. H. Waalkens	dr. T.F. Görbe
1	1B	Introduction to Graph Theory (WBMA052-05)	5	WE, AST	No	Exam week, continuous assessment (homework)	dr. S.A. Donderwinkel	prof. dr. T. Müller

Year	Period	Course	EC	Assessment methods	Does (part of the) assessment have a formative function?	Test moment(s) (e.g. mid-term, continuous assessment, exam week, etc)	First examiner	Second examiner
1	2A	Linear Algebra 2 (WBMA035-05)	5	WE	No	Mid-term, Exam week	prof. dr. J. Top	dr. ir. H.J. van Waarde
1	2A	Mechanics and Relativity (WBMA060-05)	5	WE, AST	Yes	Exam week, continuous assessment (homework)	dr. C. Simsek	prof. dr. D. Roest
1	2A	Scientific Programming (WBMA053-05)	5	WE, AST	No	Exam week,	prof. dr. C.A. Bertoglio	dr. ir. R. Luppes
1	2B	Linear Systems (WBMA043-05)	5	WE, AST	No	Exam week, continuous assessment (homework)	prof. dr. ir. B. Besselink	dr. A.E. Sterk
1	2B	First-year Project Mathematics (WBMA041-05)	5	R, P	No	Exam week	prof. dr. Oliver Lorscheid	Staff members who supervise a project
1	2B	First-year Project Applied Mathematics (WBMA40-05)	5	R, P	No	Exam week	prof. dr. Oliver Lorscheid	Staff members who supervise a project
1	2B	Probability Theory (WBMA046-05)	5	WE, AST	No	Exam week, continuous assessment (homework)	dr. G.F.Y. Bonnet	prof. dr. T. Müller
3	2A	Mathematics & Society: Ethical and Professional Aspects (WBMA049-05)	5	WE, R, AST, P	Yes	Exam week, continuous assessment	drs. J. Zevenberg	drs. G.A.H. Laugs

Year	Period	Course	EC	Assessment methods	Does (part of the) assessment have a formative function?	Test moment(s) (e.g. mid-term, continuous assessment, exam week, etc)	First examiner	Second examiner
3	2A	Preparation Bachelor's Project (WBMA056-05)	5	P, R, AST	No	Exam week, continuous assessment	prof. dr. C. Salgado Guimarães da Silva	prof. dr. J. Top
3	2B	Bachelor's Project Mathematics (WBMA902-15)	15	R, P	No	End of project	See list below (section 6)	
		Electives from Mathematics and other programmes (see assessment plans of those programmes)						
Track: General Mathematics								
2	1A	Group Theory (WBMA005-05)	5	WE, AST	No	Exam week, continuous assessment (homework)	prof. dr. J. Top	dr. P. Kilicer
2	1A	Metric and Topological Spaces (WBMA036-05)	5	WE, AST	No	Exam week, Exam week, continuous assessment (incl. homework)	dr. A.V. Kiselev	prof. dr. T. Müller
2	1A	Statistics (WBMA009-05)	5	WE, AST	No	Exam week, continuous assessment (homework)	prof. dr. M.A. Grzegorczyk	dr. W.P. Krijnen
2	1B	Complex Analysis (WBMA018-05)	5	WE, AST	No	Exam week, continuous	dr. C. Karakurt	dr. O. Lorscheid

Year	Period	Course	EC	Assessment methods	Does (part of the) assessment have a formative function?	Test moment(s) (e.g. mid-term, continuous assessment, exam week, etc)	First examiner	Second examiner
						assessment (homework)		
2	1B	Dynamical Systems (WBMA031-05)	5	WE, AST	No	Exam week, continuous assessment (homework)	prof. dr. H. Waalkens	dr. A.E. Sterk
2	1B	Multivariable Analysis (WBMA022-05)	5	WE, AST	No	Exam week, continuous assessment (homework)	dr. H. Jardón Kojakhmetov	dr. N. Martynchuk
2	2A	Functional Analysis (WBMA033-05)	5	WE, AST	Yes	Exam week, continuous assessment (homework)	dr. A.E. Sterk	prof. dr. J.G. Peypouquet
2	2A	Numerical Mathematics 1 (WBMA045-05)	5	WE, AST	Yes	Exam week, continuous assessment	prof. dr. C.A. Bertoglio	dr. J. Koellermeier
2	2A	Project Chaos Theory (24/25) (WBMA025-05)	5	R, P	No	End of project	prof. dr. H. Waalkens	dr. T.F. Görbe
2	2A	Project Security and Coding (WBMA026-05)	5	R, P	No	Continuous assessment	prof. dr. J.S. Müller	dr. E. Özman
2	2B	Algebraic Structures (WBMA039-05)	5	WE, AST	No	Exam week, continuous assessment (homework)	prof. dr. C. Salgado Guimarães da Silva	prof. dr. J.S. Müller

Year	Period	Course	EC	Assessment methods	Does (part of the) assessment have a formative function?	Test moment(s) (e.g. mid-term, continuous assessment, exam week, etc)	First examiner	Second examiner
2	2B	Geometry (WBMA034-05)	5	WE, AST	No	Exam week, continuous assessment (homework)	dr. N. Martynchuk	prof. dr. R.I. van der Veen
2	2B	Partial Differential Equations (WBMA008-05)	5	WE, AST	Yes	Exam week, continuous assessment (homework)	dr. A.E. Sterk	prof. dr. M. Seri
3	1B	Advanced Algebraic Structures (WBMA011-05)	5	WE, AST	No	Exam week, continuous assessment (homework)	prof. dr. J.S. Müller	dr. E. Özman
3	1B	Analysis on Manifolds (WBMA013-05)	5	WE, AST	Yes	Exam week, continuous assessment (homework)	prof. dr. M. Seri	dr. A.E. Sterk
3	1B	Discrete Mathematics (WBMA019-05)	5	WE, AST	No	Exam week, continuous assessment (homework)	prof. dr. T. Müller	dr. G.F.Y. Bonnet
3	1B	Introduction to Science Education (WBEC002-05)	See MSc Science Education and Communication					
3	1B	Philosophy of Science (FI180WET)	See BSc Philosophy					

Year	Period	Course	EC	Assessment methods	Does (part of the) assessment have a formative function?	Test moment(s) (e.g. mid-term, continuous assessment, exam week, etc)	First examiner	Second examiner
3	1B	Stochastic Processes (WBMA048-05)	5	WE, AST	Yes	Exam week, continuous assessment (homework)	dr. R. Szabó	prof. dr. T. Müller
Track: Probability and Statistics								
2	1A	Group Theory (WBMA005-05)	5	WE, AST	No	Exam week, continuous assessment (homework)	prof. dr. J. Top	dr. P. Kilicer
2	1A	Metric and Topological Spaces (WBMA036-05)	5	WE, AST	No	Exam week, Exam week, continuous assessment (incl. homework)	dr. A.V. Kiselev	prof. dr. T. Müller
2	1A	Statistics (WBMA009-05)	5	WE, AST	No	Exam week, continuous assessment (homework)	prof. dr. M.A. Grzegorczyk	dr. W.P. Krijnen
2	1B	Complex Analysis (WBMA018-05)	5	WE, AST	No	Exam week, continuous assessment (homework)	dr. C. Karakurt	dr. O. Lorscheid
2	1B	Discrete Mathematics (WBMA019-05)	5	WE, AST	No	Exam week, continuous assessment (homework)	prof. dr. T. Müller	dr. G.F.Y. Bonnet

Year	Period	Course	EC	Assessment methods	Does (part of the) assessment have a formative function?	Test moment(s) (e.g. mid-term, continuous assessment, exam week, etc)	First examiner	Second examiner
2	1B	Multivariable Analysis (WBMA022-05)	5	WE, AST	No	Exam week, continuous assessment (homework)	dr. H. Jardón Kojakhmetov	dr. N. Martynchuk
2	2A	Functional Analysis (WBMA033-05)	5	WE, AST	Yes	Exam week, continuous assessment (homework)	dr. A.E. Sterk	prof. dr. J.G. Peypouquet
2	2A	Numerical Mathematics 1 (WBMA045-05)	5	WE, AST	Yes	Exam week, continuous assessment	prof. dr. C.A. Bertoglio	dr. J. Koellermeier
2	2A	Project Statistical Reasoning (23/24) (WBMA038-05)	5	WE, AST	No	Exam week, continuous assessment (homework)	prof. dr. M.A. Grzegorczyk	dr. W.P. Krijnen
2	2B	Geometry (WBMA034-05)	5	WE, AST	No	Exam week, continuous assessment (homework)	dr. N. Martynchuk	prof. dr. R.I. van der Veen
2	2B	Partial Differential Equations (WBMA008-05)	5	WE, AST	Yes	Exam week, continuous assessment (homework)	dr. A.E. Sterk	prof. dr. M. Seri
2	2B	Probability and Measure (WBMA024-05)	5	WE, AST	Yes	Exam week, continuous	dr. G.F.Y. Bonnet	prof. dr. J.P. Trapman

Year	Period	Course	EC	Assessment methods	Does (part of the) assessment have a formative function?	Test moment(s) (e.g. mid-term, continuous assessment, exam week, etc)	First examiner	Second examiner
						assessment (homework)		
3	1B	Statistical Modelling (WBMA028-05)	5	WE, AST	No	Exam week, continuous assessment (homework)	dr. W.P. Krijnen	prof. dr. M.A. Grzegorczyk
3	1B	Stochastic Processes (WBMA048-05)	5	WE, AST	Yes	Exam week, continuous assessment (homework)	dr. R. Szabó	prof. dr. T. Müller

The abbreviations for the relevant teaching methods are explained in the legend of the table.
Examples of assessment methods include:

- *Written Exam (WE)*
- *Multiple Choice (MC)*
- *Oral Exam (OR)*
- *Report (R)*
- *Presentation (P)*
- *Practical Work (PR)*
- *Assignment (AST)*

5. Relationship between course units and details of the learning outcomes

Please note in the table below the course units per block in the programme. Indicate which learning outcomes are assessed in which courses by adding an X in the relevant cell. Please add extra rows if necessary.
An X means that the learning outcome is explicitly assessed (not merely addressed) in the course.

		Learning outcomes of the degree programme - track General Mathematics																							
		A 1	A 2						A 3	A 4	A 5	A 6	B 1				B 2					B 3	B 4	B 5	B 6	B 7
			1.1	1.2	1.3	1.4	1.5	1.6					2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9					
Period	**Course**	**Year 1 –compulsory courses**																								
1A	Calculus 1 (WBMA003-05)		X			X							X	X												
1A	Linear Algebra 1 (WBMA020-05)		X			X		X		X			X						X	X						
1A	Sets and Numbers (WBMA051-05)		X			X							X		X											
1B	Analysis (WBMA012-05)	X	X			X							X		X											
1B	Calculus 2 (WBMA029-05)		X			X							X	X												
1B	Introduction to Graph Theory (WBMA052-05)		X			X							X	X	X											
2A	Linear Algebra 2 (WBMA035-05)		X			X							X		X				X	X						

		Learning outcomes of the degree programme - track General Mathematics																								
		A 1	A 2						A 3	A 4	A 5	A 6	B 1				B 2					B 3	B 4	B 5	B 6	B 7
			1.1	1.2	1.3	1.4	1.5	1.6					2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9					
2A	Mechanics and Relativity (WBMA060-05)					X	X			X			X					X								
2A	Scientific Programming (WBMA053-05)							X		X			X	X			X	X					X			
2B	Linear Systems (WBMA043-05)		X			X	X						X	X			X	X								
Period	**Course**	**Year 1 Electives (if applicable)**																								
2B	First-year Project Mathematics (WBMA041-05)						X	X		X			X	X			X	X		X		X	X	X	X	X
2B	First-year Project Applied Mathematics (WBMA40-05)						X	X		X			X	X			X	X		X		X	X	X	X	X
Period	**Course**	**Year 2 compulsory courses**																								
1A	Group Theory (WBMA005-05)		X		X	X							X	X	X					X						
1A	Metric and Topological Spaces (WBMA036-05)			X	X	X					X		X	X	X					X						

		Learning outcomes of the degree programme - track General Mathematics																								
		A 1	A 2						A 3	A 4	A 5	A 6	B 1				B 2					B 3	B 4	B 5	B 6	B 7
			1.1	1.2	1.3	1.4	1.5	1.6					2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9					
1A	Statistics (WBMA009-05)		X			X	X	X		X			X	X		X		X		X						
1B	Complex Analysis (WBMA018-05)		X			X							X	X		X			X	X						
1B	Dynamical Systems (WBMA031-05)			X	X	X	X		X	X			X	X		X		X	X	X						
1B	Multivariable Analysis (WBMA022-05)		X			X							X	X	X			X	X	X						
2A	Functional Analysis (WBMA033-05)			X	X	X				X	X		X	X	X					X						
2A	Mathematics & Society: Ethical and Professional Aspects (WBMA049-05)	X										X	X									X	X	X	X	
2A	Numerical Mathematics 1 (WBMA045-05)			X		X	X	X		X			X	X						X	X						
2B	Algebraic Structures (WBMA039-05)			X	X	X			X		X		X	X	X						X					X
2B	Geometry (WBMA034-05)			X	X	X					X		X	X	X						X					X

		Learning outcomes of the degree programme - track General Mathematics																								
		A1	A2						A3	A4	A5	A6	B1				B2					B3	B4	B5	B6	B7
			1.1	1.2	1.3	1.4	1.5	1.6					2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9					
2B	Partial Differential Equations (WBMA008-05)		X			X	X						X	X		X		X	X	X						
Period	**Course**	**Year 2 Electives (if applicable)**																								
2A	Project Chaos Theory (24/25) WBMA025-05						X			X			X	X		X	X	X		X		X	X	X		
2A	Project Security and Coding (WBMA026-05)						X			X			X	X		X	X	X		X		X	X	X		
Period	**Course**	**Year 3 compulsory courses**																								
2A	Mathematics & Society: Ethical and Professional Aspects (WBMA049-05)	X										X	X									X	X	X	X	
2A	Preparation Bachelor's Project (WBMA056-05)	X							X			X						X			X	X	X	X	X	
2B	Bachelor's Project Mathematics (WBMA902-15)			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X

		Learning outcomes of the degree programme - track General Mathematics																								
		A 1	A 2						A 3	A 4	A 5	A 6	B 1				B 2					B 3	B 4	B 5	B 6	B 7
			1.1	1.2	1.3	1.4	1.5	1.6					2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9					
Period	**Course**	**Year 3 Electives (if applicable)**																								
1B	Advanced Algebraic Structures (WBMA011-05)			X	X	X							X	X	X					X						
1B	Analysis on Manifolds (WBMA013-05)			X	X	X							X	X	X					X						
1B	Discrete Mathematics (WBMA019-05)		X			X	X						X	X	X	X	X	X	X	X						
1B	Introduction to Science Education (WBEC002-05)	X										X											X	X	X	X
1B	Philosophy of Science (FI180WET)	X										X												X	X	
1B	Stochastic Processes (WBMA048-05)			X	X	X			X		X		X	X	X		X	X		X	X					

		Learning outcomes of the degree programme - track Probability and Statistics																								
		A 1	A 2						A 3	A 4	A 5	A 6	B 1				B 2						B 3	B 4	B 5	B 6	B 7
			1.1	1.2	1.3	1.4	1.5	1.6					2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10					
Period	**Course**	**Year 1 –compulsory courses**																									
1A	Calculus 1 (WBMA003-05)		X			X	X	X		X			X	X		X		X		X							
1A	Linear Algebra 1 (WBMA020-05)		X			X							X	X		X			X	X							
1A	Sets and Numbers (WBMA051-05)			X	X	X	X		X	X			X	X		X		X	X	X							
1B	Analysis (WBMA012-05)		X			X							X	X	X			X	X	X							
1B	Calculus 2 (WBMA029-05)			X	X	X				X	X		X	X	X					X							
1B	Introduction to Graph Theory (WBMA052-05)	X										X	X														
2A	Linear Algebra 2 (WBMA035-05)			X		X	X	X		X			X	X					X	X							
2A	Mechanics and Relativity (WBMA060-05)			X	X	X			X		X		X	X	X						X						
2A	Scientific Programming (WBMA053-05)			X	X	X					X		X	X	X						X			X			

		Learning outcomes of the degree programme - track Probability and Statistics																									
		A 1	A 2						A 3	A 4	A 5	A 6	B 1				B 2						B 3	B 4	B 5	B 6	B 7
			1.1	1.2	1.3	1.4	1.5	1.6					2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10					
2B	Linear Systems (WBMA043-05)		X			X	X						X	X		X		X	X	X							
Period	**Course**	**Year 1 Electives (if applicable)**																									
2B	First-year Project Mathematics (WBMA041-05)						X	X		X			X	X			X	X		X		X	X	X	X	X	X
2B	First-year Project Applied Mathematics (WBMA40-05)						X	X		X			X	X			X	X		X		X	X	X	X	X	X
Period	**Course**	**Year 2 compulsory courses**																									
1A	Group Theory (WBMA005-05)		X		X	X							X	X	X					X							
1A	Metric and Topological Spaces (WBMA036-05)			X	X	X					X		X	X	X					X							
1A	Statistics (WBMA009-05)		X			X	X	X		X			X	X		X		X		X							
1B	Complex Analysis (WBMA018-05)		X			X							X	X		X			X	X							

		Learning outcomes of the degree programme - track Probability and Statistics																									
		A 1	A 2						A 3	A 4	A 5	A 6	B 1				B 2						B 3	B 4	B 5	B 6	B 7
			1.1	1.2	1.3	1.4	1.5	1.6					2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10					
1B	Discrete Mathematics (WBMA019-05)		X			X	X						X	X	X	X	X	X	X	X							
1B	Multivariable Analysis (WBMA022-05)		X			X							X	X	X			X	X	X							
2A	Functional Analysis (WBMA033-05)			X	X	X				X	X		X	X	X					X							
2A	Numerical Mathematics 1 (WBMA045-05)			X		X	X	X		X			X	X					X	X							
2A	Project Statistical Reasoning (23/24) (WBMA038-05)					X	X			X			X	X		X	X	X		X		X	X	X	X		
2B	Geometry (WBMA034-05)			X	X	X					X		X	X	X						X					X	
2B	Partial Differential Equations (WBMA008-05)		X			X	X						X	X		X		X	X	X							
2B	Probability and Measure (WBMA024-05)		X		X	X			X		X		X	X	X	X			X	X							

		Learning outcomes of the degree programme - track Probability and Statistics																									
		A1	A2						A3	A4	A5	A6	B1				B2						B3	B4	B5	B6	B7
			1.1	1.2	1.3	1.4	1.5	1.6					2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10					
Period	**Course**	**Year 3 compulsory courses**																									
1B	Statistical Modelling (WBMA028-05)						X	X								X	X	X	X	X	X	X					
1B	Stochastic Processes (WBMA048-05)			X	X	X			X		X		X	X	X		X	X		X	X						
2A	Preparation Bachelor's Project (WBMA056-05)	X							X			X						X			X		X	X	X	X	
2A	Mathematics & Society: Ethical and Professional Aspects (WBMA049-05)	X										X	X										X	X	X	X	
2B	Bachelor's Project Mathematics (WBMA902-15)			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X
Period	**Course**	**Year 3 Electives (if applicable)**																									
1B	Advanced Algebraic Structures (WBMA011-05)			X	X	X							X	X	X					X							

		Learning outcomes of the degree programme - track Probability and Statistics																									
		A 1	A 2						A 3	A 4	A 5	A 6	B 1				B 2						B 3	B 4	B 5	B 6	B 7
			1.1	1.2	1.3	1.4	1.5	1.6					2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10					
1B	Analysis on Manifolds (WBMA013-05)			X	X	X							X	X	X					X							
1B	Discrete Mathematics (WBMA019-05)		X			X	X						X	X	X	X	X	X	X	X							
1B	Introduction to Science Education (WBEC002-05)	X										X												X	X	X	X
1B	Philosophy of Science (FI180WET)	x										X													X	X	
1B	Stochastic Processes (WBMA048-05)			X	X	X			X		X		X	X	X		X	X		X	X						

6. Examiners for the Bachelor Project Mathematics

Examiners for the Bachelor Project Mathematics:
prof. dr. C.A. Bertoglio
prof. dr. ir. B. Besselink
dr. G.F.Y. Bonnet
prof. dr. M.K. Camlibel
dr. S.A. Donderwinkel
dr. T.F. Görbe
prof. dr. M.A. Grzegorczyk
dr. H. Jardón Kojakhmetov
dr. C. Karakurt
dr. P. Kilicer
dr. A.V. Kiselev
dr. J. Koellermeier
dr. W.P. Krijnen
prof. dr. O. Lorscheid
dr. ir. R. Luppes
prof. dr. J.S. Müller
prof. dr. T. Müller
dr. N. Martynchuk
dr. E. Özman
prof. dr. J.G. Peypouquet
prof. dr. C. Salgado Guimarães da Silva
prof. dr. M. Seri
dr. A.E. Sterk
dr. R. Szabó
dr. P.M.J. Tibboel
prof. dr. J. Top
prof. dr. J.P. Trapman
prof. dr. S. Trenn
prof. dr. R.I. van der Veen
prof. dr. ir. R.W.C.P. Verstappen
prof. dr. H. Waalkens
dr. ir. H.J. van Waarde

On an individual basis the Board of Examiners can allow examiners of other degree programmes to act as examiner for the Bachelor project of the bachelor's degree programme in Mathematics as well.