Assessment plan for the curriculum of the Bachelor's degree programme in Mathematics, 2023-2024

Introduction

This assessment plan is a systematic description of the testing and assessment modes for all study components in the curriculum of the Bachelor's degree programme in Mathematics, 2023-2024. The plan is based on the assessment policy of the Faculty of Science and Engineering, as set out in the 2016-2017 version of the FMNS Quality Assurance Manual (Chapter 6: Assessment) and the protocol setting out the duties and powers of the Faculty's Board of Examiners (December 2013).

The assessment plan for the curriculum consists of the following parts:

1. objective(s) of the degree programme
2. the learning outcomes of the degree programme
3. descriptions of the study components, as set out in the appendices to the Teaching and Examination Regulations 2023-2024 of the degree programme
4. descriptions of the content of each study component in Ocasys, the online course catalogue. The following elements are relevant in this context:
    - objectives
    - description of content
    - lecturers
    - assessment mode(s) and calculation of final mark
    - mode(s) of instruction.
5. An overview of the examiners and a detailed assessment mode for each study component. This overview is based on the curriculum approved by the Programme Committee, as set out in the appendices to the Teaching and Examination Regulations 2023-2024 for the degree programme.
6. A matrix showing the relationship between the study components and the detailed learning outcomes for each competence area.

Parts 3 and 4 are not included in this document. For the descriptions of the study components, see the Appendix to the Teaching and Examination Regulations 2023-2024 for the degree programme in Mathematics. Descriptions of the content of each study component can be found in Ocasys, the online course catalogue (http://www.rug.nl/ocasys/).

The 2023-2024 curriculum is based on the 2022-2023 curriculum. In 2022-2023 the curriculum has been slightly adjusted and was largely based on the curriculum that was introduced in 2018-2019. The current assessment plan applies to the cohorts 2018-2019 and later. The assessment plan for the cohorts 2017-2018 and earlier is part of the assessment plan 2019-2020. As the assessment plan for the cohorts 2017-2018 is not altered, it is not described again here; a systematic description of the testing and assessment modes for all study components in the curriculum before 2018-2019 can be found in the assessment plan 2019-2020.

1. Objectives of the degree programme

As a consequence of the ongoing automation of society and the technological innovations that go along with this, the call of our society for mathematics is growing. Underneath virtually every form of automation lies a mathematical concept or model. In order to be able to respond to this development in society, it is important that mathematics is utilised in a proper and effective way. This requires that society has access to sufficiently many well qualified and highly trained mathematicians.

The Bachelor's degree programme in Mathematics aims to impart knowledge, skills, understanding and an academic attitude in the field of mathematics by means of a broadly based curriculum such that Bachelor's graduates are able to pursue an independent career as independent professionals and are also qualified for further training to become academic researchers in the field.

The Bachelor's graduate must be able to progress to the follow-on Master's degree programme in Mathematics. Graduates of the bachelor's degree programme in Mathematics should also be able to take the Master's degree programme in Applied Mathematics or in Education and Communication. In addition, Bachelor's graduates who have taken the 'Educatieve Minor' (teacher-training minor) gain a Grade Two teaching qualification in mathematics.

2. Learning outcomes

BSc Mathematics track General Mathematics

The above aim has been translated into a set of learning outcomes which consists of generic learning outcomes complemented with specific learning outcomes with respect to both Knowledge and Skills.

A. Generic learning outcomes – Knowledge

Bachelor's graduates in Mathematics track General Mathematics:

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.

B. Generic learning outcomes – Skills

Bachelor's graduates in Mathematics track General Mathematics:

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, emphasise 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 emphasising 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.

Appendix I Specified basic knowledge related learning outcomes
Bachelor's graduates in Mathematics track General Mathematics:

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.

Appendix II Degree programme-specific learning outcomes – Skills
Bachelor's graduates in Mathematics track General Mathematics

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 organised way, to apply exact logical arguments when solving problems, and to generalise 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 outcomes BSc Mathematics track Probability and Statistics

This track differs in the following learning outcomes from the track General 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).

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.

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.

Appendix I Specified basic knowledge related learning outcomes

Bachelor's graduates in Mathematics track Probability and Statistics:

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.

Appendix II Degree programme-specific learning outcomes – Skills

Bachelor's graduates in the Mathematics track Probability and Statistics

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 organised way, to apply exact logical arguments when solving problems, and to generalise 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.

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

In this section the relation between the course units and the learning outcomes is given in the following set of tables.

The following notation is used:

1 : the course makes a limited contribution to the specified learning outcome

2: the course makes a substantial contribution to the specified learning outcome

Year 1: Mathematics & Probability and Statistics

Generic learning outcomes	Specified basic knowledge related learning outcomes	Calculus 1	Linear Algebra 1	Sets and Numbers	Introduction to Graph Theory	Analysis	Elective: Intro to Logic/ Mechanics and Relativity for Math	Calculus 2	Linear Algebra 2	Scientific Programming	Linear Systems	Probability Theory	Elective: First-year Project Mathematics/Applied Mathematics
A1						1						1	
A2	1.1	2	2	2	2	2		2	2		1	2	
	1.2												
	1.3												
	1.4	1	1	2	2	1	1	1	1		1	1	
	1.5						1				1		1
	1.6		1							1			1
A3													
A4			1				1			1			1
A5													
A6													
B1	2.1	1	1	1	1	1	1	1	1	1	1	1	1
	2.2	1			1			1		1	1	1	1
	2.3			1	1	1			1			1	
	2.4												
B2	2.5									1	1		1
	2.6						1			1	1		1
	2.7		1						1				
	2.8		1						1			1	1
	2.9												
	2.10												1
B3													1
B4										1			1
B5													1
B6													1
B7													1

Year 2: Mathematics

Generic learning outcomes	Specified basic knowledge related learning outcomes	Group Theory	Partial Differential Equations	Statistics	Complex Analysis	Multivariable Analysis	Elective: Project Chaos Theory / Project Security and Coding*	Dynamical Systems	Geometry	Metric and Topological Spaces	Algebraic Structures	Numerical Mathematics 1	Functional Analysis
A1													
A2	1.1	2	2	2	2	2							
	1.2							2	2	2	2	2	2
	1.3	1						1	1	1	1		1
	1.4	1	1	1	1	1		1	1	1	1	1	1
	1.5		1	1			2	1				1	
	1.6			2								2	
A3								2			2		
A4				1			1	1				1	1
A5									1	1	1		1
A6													
B1	2.1	1	1	1	1	1	1	1	1	1	1	1	1
	2.2	1	1	1	1	1	1	1	1	1	1	1	1
	2.3	1				1			1	1	1		1
	2.4		1	1	1		1	1					
B2	2.5						2						
	2.6		1	1		1	1	1					
	2.7		1		1	1		1				1	
	2.8	1	1	1	1	1	1	1		1		1	1
	2.9								1		1		
B3							1						
B4							1						
B5							1						
B6													
B7									1		1		

*Project Chaos Theory or Project Security and Coding may also be taken in year 3 (instead of Mathematics and Society).

Year 3: Mathematics

		Two out of six										
Generic learning outcomes	Specified basic knowledge related learning outcomes	Advanced Algebraic Structures	Analysis on Manifolds	Introduction to Science Education	Stochastic Processes	Discrete Mathematics	Philosophy of Science	Mathematics & Society: Ethical and Professional Aspects*	Preparation Bachelor Project	Bachelor Research Project (15 ECTS)	2 Electives (Total 10 ETCS)**	Minor (15 ECTS)***
A1				1			2	2	1			
A2	1.1					2						
	1.2	2	2		1					1		
	1.3	1	1		2					1		
	1.4	1	1		1	1				1		
	1.5					1				1		
	1.6									1		
A3					1				1	1		
A4										1		
A5					1					1		
A6				1			1	2	1	1		
B1	2.1	1	1		1	1		1		1		
	2.2	1	1		1	1				1		
	2.3	1	1		1	1				1		
	2.4					1				1		
B2	2.5				1	1				1		
	2.6				1	1			1	1		
	2.7					1				1		
	2.8	1	1		1	1				1		
	2.9				1				1	1		
B3								1	1	1		
B4				1				1	1	1		
B5				2			1	1	1			
B6				2			2	2	1			
B7				1						1		

*Mathematics and Society may also be taken in year 2 (instead of Project Chaos Theory or Project Security and Coding)

**Elective course units can be chosen from the post-propaedeutic courses of the Bachelor's programme in Mathematics and Applied Mathematics as long as they are

not otherwise part of the student's programme. In addition, the electives may be chosen from:

One out of: - Functional Programming - C++ Fundamentals
Programming in C++
Advanced Logic
Symmetry in Physics
Quantum Physics 1

***The minor (15 ECTS) can be chosen from (see Ocasys for details):

a. University-wide broadening minors
b. Faculty-wide deepening minors
c. Minor Mathematics (see below)
d. Personal minor, based on an individual choice of course units to be approved by the Board of Examiners; the minor must be coherent and of sufficient level.

In addition, the programme offers the option of a Minor Abroad (30 ECTS) or an Education Minor (30 ECTS). Students who take a Minor Abroad or an Education Minor follow 150 ECTS from the programme (instead of 165 ECTS); see TER for details.

The Minor Abroad has to satisfy the following two conditions:
- at least 15 ECTS of Mathematics (related) courses relevant to the student's track (at the discretion of the Board of Examiners)
- two coherent packages of 15 ECTS or one coherent package of 30 ECTS, both of sufficient level (at the discretion of the Board of Examiners)

Deepening Minor Mathematics: 3 out of 4

Generic learning outcomes	Specified basic knowledge related learning outcomes	Elementary Number Theory	Percolation Theory	Algebraic Topology	Introduction to Optimization
A1					1
A2	1.1	1	1		
	1.2	1	1	2	2
	1.3	1	1	1	
	1.4	1	1	1	1
	1.5				1
	1.6				
A3		1	1	1	1
A4					1
A5					
A6					
B1	2.1	1	1	1	1
	2.2	1	1	1	1
	2.3	1	1	1	1
	2.4				
B2	2.5				
	2.6				1
	2.7	1	1	1	1
	2.8				
	2.9				
B3					
B4					
B5					
B6					
B7					

Year 2: Specialisation Probability and Statistics

Generic learning outcomes	Specified basic knowledge related learning outcomes	Group Theory	Partial Differential Equations	Statistics	Complex Analysis	Multivariable Analysis	Geometry	Discrete Mathematics	Probability and Measure	Project Statistical Reasoning*	Metric and Topological Spaces	Numerical Mathematics 1	Functional Analysis
A1													
A2'	1.1	2	2	2	2	2		2	2				
	1.2						2				2	2	2
	1.3	1					1		1		1		1
	1.4	1	1	1	1	1	1	1	1	1	1	1	1
	1.5		1	1				1		2		1	
	1.6			2								2	
A3									1				
A4				1						1		1	1
A5							1		1		1		1
A6													
B1	2.1	1	1	1	1	1	1	1	1	1	1	1	1
	2.2	1	1	1	1	1	1	1	1	1	1	1	1
	2.3	1				1	1	1	1		1		1
	2.4		1	1	1			1	1	1			
B2'	2.5							1		2			
	2.6		1	1		1		1		1			
	2.7		1		1	1		1	1			1	
	2.8	1	1	1	1	1		1	1	1	1	1	1
	2.9						1						
	2.10									1			
B3										1			
B4										1			
B5'										1			
B6							1						
B7													

*Project Statistical Reasoning may also be taken in year 3 (instead of Mathematics and Society).

Year 3: Specialisation Probability and Statistics

Generic learning outcomes	Specified basic knowledge related learning outcomes	Stochastic Processes	Statistical Modeling	Mathematics & Society: Ethical and Professional Aspects*	Preparation Bachelor Project	Bachelor Research Project (15 ECTS)	2 Electives (10 ECTS)	Minor (15ECTS)
A1				2	1			
A2'	1.1							
	1.2	1				1		
	1.3	2				1		
	1.4	1				1		
	1.5		1			1		
	1.6		1			1		
A3		1			1	1		
A4						1		
A5		1				1		
A6				2	1	1		
B1	2.1	1		1		1		
	2.2	1				1		
	2.3	1				1		
	2.4		2			1		
B2'	2.5	1	1			1		
	2.6	1	1		1	1		
	2.7		1			1		
	2.8	1	1			1		
	2.9	1	1		1	1		
	2.10		2					
B3				1	1	1		
B4				1	1	1		
B5'				1	1			
B6				2	1			
B7		1				1		

*Mathematics and Society may also be taken in year 2 (instead of Project Statistical Reasoning)

**Elective course units can be chosen from the post-propaedeutic courses of the Bachelor's programme in Mathematics and Applied Mathematics as long as they are

not otherwise part of the student's programme. In addition, the electives may be chosen from:

One out of: - Functional Programming - C++ fundamentals
Programming in C++
Dynamic Econometrics
Game Theory
Risk Insurance
Statistical Signal Processing
One out of: - Life Insurance - Introduction to Econometrics

***The minor (15 ECTS) can be chosen from (see Ocasys for details):

a. University-wide broadening minors
b. Faculty-wide deepening minors
c. Minor Mathematics (see above)
d. Personal minor, based on an individual choice of course units to be approved by the Board of Examiners; the minor must be coherent and of sufficient level.

In addition, the programme offers the option of a Minor Abroad (30 ECTS) or an Education
Minor (30 ECTS). Students who take a Minor Abroad or an Education Minor follow 150 ECTS
from the programme (instead of 165 ECTS); see TER for details.
The Minor Abroad has to satisfy the following two conditions:
- at least 15 ECTS of Mathematics (related) courses relevant to the student's track (at the discretion of the Board of Examiners)
- two coherent packages of 15 ECTS or one coherent package of 30 ECTS, both of sufficient level (at the discretion of the Board of Examiners)

6. Overview of examiners and testing and assessment modes for study components as offered in 2023-2024

In this section, an overview of the examiners and a detailed assessment mode for each study component is given. This overview is based on the curriculum approved by the Programme Committee, as set out in the appendices to the Teaching and Examination Regulations 2023-2024 for the degree programme.

The abbreviations for the relevant modes of assessment:

- Written exam with open questions (WE)
- Oral exam (OR)
- Assignment (AST)
- Practical Work (PR)
- Presentation (P)
- Report (R)
- Interim test (IT)
- Multiple choice (MC)

Course unit name	ECTS	First Examiner(s)	Second Examiner (if necessary)	Practical	Mode of assessment
Year 1					
Calculus 1	5	dr. T.F. Görbe	dr. H. Jardon Kojakhmetov		AST, IT, WE
Linear Algebra 1	5	prof. dr. M.K. Camlibel	dr. ir. H.J. van Waarde		AST, IT, WE
Sets and Numbers	5	prof. dr. J. Top	dr. R.I. van der Veen		WE
Calculus 2	5	prof. dr. H. Waalkens	dr. T.F. Görbe		AST, IT, WE
Introduction to Graph Theory	5	prof. dr. T. Müller	prof. dr. J.P. Trapman		AST, WE
Analysis	5	dr. A.E. Sterk	prof. dr. J. Top		AST, WE
Scientific Programming	5	prof. dr. C.A. Bertoglio	dr. J. Koellermeier	X	PR, WE, OR
Linear Algebra 2	5	prof. dr. J. Top	dr. ir. H.J. van Waarde		IT, WE
Linear Systems	5	prof. dr.ir. B. Besselink	dr. A.E. Sterk		AST, WE
Probability Theory	5	dr. G.F.Y. Bonnet	prof. dr. T. Müller		AST, WE
Electives Year 1					
First-year Project Mathematics/Applied Mathematics	5	prof. dr. O. Lorscheid	Staff members who supervise a project		P, R
Introduction to Logic	5	See BSc AI			AST, WE, IT
Mechanics & Relativity for Maths	5	dr. C. Simsek	prof. dr. D. Roest		AST, WE

Course unit name	ECTS	First Examiner(s)	Second Examiner (if necessary)	Practical	Mode of assessment
Year 2					
Partial Differential Equations	5	dr. P.M.J. Tibboel	dr. M. Seri		AST, IT, WE
Statistics	5	prof. dr. M.A. Grzegorczyk	dr. W.P. Krijnen		AST, WE
Complex Analysis	5	prof. dr. O. Lorscheid	dr. T.F. Görbe		AST, WE
Group Theory	5	dr. P. Kilicer	dr. J.S. Müller		AST, WE, MC
Metric and Topological Spaces	5	dr. A.V. Kiselev	prof. dr. T. Müller		AST, WE
Numerical Mathematics 1	5	prof. dr. C.A. Bertoglio	dr. J. Koellermeier	X	OR, WE, AST
Functional Analysis	5	dr. A.E. Sterk	prof. dr. J.G. Peypouquet		AST, WE
Multivariable Analysis	5	dr. H. Jardon Kojakhmetov	dr. N. Martynchuk		AST, WE
Dynamical Systems	5	prof. dr. H. Waalkens	dr. A.E. Sterk		AST, WE
Project Security and Coding	5	dr. P. Kilicer	dr. J.S. Müller	X	AST, P, R
Project Chaos Theory	5	prof. dr. H. Waalkens	dr. T.F. Görbe	X	P, R
Geometry	5	dr. N. Martynchuk	dr. R.I. van der Veen		AST, WE
Algebraic Structures	5	prof. dr. C. Salgado	dr. J.S. Müller		AST, WE
Project Statistical Reasoning	5	prof. dr. M.A. Grzegorczyk	prof. dr. W.P. Krijnen	X	AST, WE
Discrete Mathematics	5	prof. dr. T. Müller	dr. G.F.Y. Bonnet		AST, WE
Probability and Measure	5	prof. dr. J.P. Trapman	prof. dr. T. Müller		AST, WE

Course unit name	ECTS	First Examiner(s)	Second Examiner (if necessary)	Practical	Mode of assessment
Year 3					
Mathematics and Society: Ethical and Professional Aspects	5	drs. J. Zevenberg	G.A.H. Laugs, MSc		WE, MC, R, P, AST
Preparation Bachelor's Project	5	prof. dr. C. Salgado	dr. ir. G. Tiesinga		AST, P, R
Bachelor's Project Mathematics	15	See list below	See list below	X	P, R
Analysis on Manifolds	5	dr. M. Seri	dr. A.E. Sterk		AST, WE
Advanced Algebraic Structures	5	dr. J.S. Muller	dr. T. Keller		AST, WE

Statistical Modelling	5	dr. W.P. Krijnen	prof. dr. M.A. Grzegorczyk		AST, WE
Stochastic Processes	5	dr. R. Szabo	dr. G.F.Y. Bonnet		AST, WE
Discrete Mathematics	5	prof. dr. T. Müller	dr. G.F.Y. Bonnet		AST, WE
Stochastic Processes	5	dr. R. Szabo	dr. G.F.Y. Bonnet		AST, WE
Elementary Number Theory	5	dr. P. Kilicer	prof. dr. J. Top		AST, WE
Percolation Theory	5	prof. dr. T. Müller	prof. dr. J.P. Trapman		AST, WE
Algebraic Topology	5	dr. R.I. van der Veen	prof. dr. O. Lorscheid		AST, WE
Introduction to Optimization	5	prof. dr. J.G. Peypouquet	prof. dr. M.K. Camlibel	X	AST, WE, R
Electives from other degree programmes, see assessment plan of the BSc degree programme that provides the course.					

Examiners for the Bachelor Project

prof. dr. C.A. Bertoglio
prof. dr. ir. B. Besselink
dr. G.F.Y. Bonnet
prof. dr. M.K. Camlibel
dr. S. Donderwinkel
dr. T.K. Gebretekle
dr. T.F. Görbe
prof. dr. M.A. Grzegorczyk
dr. H. Jardon Kojakhmetov
dr. P. Kilicer
dr. A.V. Kiselev
dr. J. Koellermeier
dr. W.P. Krijnen
prof. dr. O. Lorscheid
dr. ir. R. Luppes
dr. J.S. Müller
prof. dr. T. Müller
dr. N. Martynchuk
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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.