Teaching and Examination Regulations

Bachelor programme in Mathematics
Faculty of Sciences

Academic year 2018-2019

B1. Programme specific section - general provisions
B2. Programme specific section – content of programme

Section B1: Programme specific – general provisions

7. General programme information and characteristics

Article 7.1 Study programme information

1.	The programme Mathematics CROHO number 59322 is offered on a full-time and part-time basis.	Advice OLC; approval FGV (7.13 i)
1a.	In 2018-2019, the language of instruction is English (year 1) and Dutch (years 2 and 3).	Advice OLC; approval FGV (9.38 b)
2.	A unit of study comprises 6 EC or a multiple thereof. The units of study listed below have a different size:	

Course code	Course component	EC
X_400629	Introduction to Programming (PYTHON)	3
XB_0006	Introduction to Mathematical Modelling	3
X_400462	Wiskundig Modelleren 3	3
X_400652	History of Science	3
X_400433	Philosophy	3

Article 7.2 Teaching formats used and modes of assessment

1.	The programme uses the teaching formats as specified in the Study Guide.	Advice OLC; approval FGV (7.13 x)
2.	The modes of assessment used per educational component are specified in the Study Guide.	Advice OLC; approval FGV (7.13 l)

8. Further admission requirements

Article 8.1 Additional previous education requirements

1.	Students who do not meet the previous education requirements as stipulated in 'Regulations on Additional Prior Education Requirements for Higher Education' (Ministry of Education Culture and Science) currently in force, may still be admitted to the programme by successfully completing one or more of the following exams: not applicable.	Exception in WHW: advice OLC
2.	Applicants with a diploma from a country other than the Netherlands will meet the profile requirements as stated under paragraph 1 if the level of mathematics and the topics covered are comparable to Mathematics B as taught in Dutch pre-university secondary school programmes (VWO). The Examination Board will assess whether these conditions have been met. The topics covered are specified in Appendix IV.	
3.	The holder of a diploma from a country that has ratified the Lisbon Treaty (Trb. 2002, 137) and that provides access to university education in that country, is exempt from the prior education requirement referred to in paragraph 1 and 2, subject to the proviso that the profile requirements and additional requirements must have been	

	met. The holder of this diploma must also demonstrate sufficient proficiency in the English language.	
4.	Anyone in possession of a diploma from a country other than those stipulated in paragraph 3 may be admitted after the conditions applied by Vrije Universiteit Amsterdam's admission office have been met. These conditions include mathematics at a sufficient level as referred to in paragraph 2 and a sufficient command of the language of tuition.	
5.	Students who do not meet the previous education requirements but have successfully completed the first year of a higher professional education programme (HBO) can gain admission to the programme by demonstrating that their level of mathematics is comparable to Mathematics B as taught in Dutch pre-university secondary school programmes. The Admission Board will assess whether these conditions have been met. These conditions include a sufficient command of the language of tuition.	Advice OLC; approval FGV (9.38 b)

Article 8.2 Colloquium doctum (entrance examination)

1.	Persons aged 21 years and older who do not meet the requirements for previous education can submit a request to the Executive Board to take an entrance examination (colloquium doctum), as stipulated in Section 7.29 of the WHW. The entrance examination concerns the following subjects at final pre-university examination level: a. Mathematics B equivalent to final-examination university entry level (VWO) and b. A command of English equivalent to pre-university final-exam level (VWO).	Advice OLC; approval FGV (9.38 b)
2.	The proof that the entrance examination has been passed, only provides entitlement to admission to the intended programme or programmes for the two academic years after the examination was taken.	Advice OLC; approval FGV (9.38 b)

Article 8.3 English language requirement for English-language Bachelor's programmes

1.	The proficiency requirement in English (if it is the language of instruction) is met if the student can demonstrate a command of English equivalent to pre-university final-exam level (VWO). This can in particular be done by the successful completion of one of the following examinations or an equivalent, with at least the scores specified: - IELTS: 6.5 - TOEFL paper based test: 580 - TOEFL internet based test: 92 - Cambridge Advanced English: A, B or C	Landelijke gedragscode Internationale studenten *Advice OLC, approval FGV if higher scores*
2.	Exemption is granted from the examination in English referred to in paragraph 1 to students who, no longer than two years before the start of the programme, have met the requirements of the VU test in English language proficiency TOEFL ITP, with at least the scores specified in paragraph 1, or: - had previous education in secondary or tertiary education in an English-speaking country as listed on the VU website; - have an English-language 'international baccalaureate' diploma; - have an English-language diploma of a Bachelor or Master degree programme which has been accredited by the NVAO in the Netherlands.	Advice OLC; approval FGV

Article 8.4 Other language requirements

Not applicable.	Advice OLC; approval FGV (9.38 b)

9. Interim examinations and results

Article 9.1 Sequence of interim examinations

The following restrictions apply to the order in which students may take examinations: • All first-year students in the Mathematics programme are required to participate in the first-year Mentorship in periods 1 and 2. Students can only receive credits for completing the Introduction to Mathematical Modelling course if they have participated in the first-year Mentorship. • All second-year students of Mathematics are required to take the Study and Career course in period 6. Students can only receive credits for completing the Project Wiskunde course if they have passed the Study and Career course. • Students may only start on the Bachelorproject Wiskunde if they meet the following condition at the start of the course: they have earned at least 120 of the full 180 credits.	Advice OLC; approval FGV (7.13 , 7.13 s/t)

Article 9.2 Validity period for results

1. As laid down in article 3.8	Advice OLC; approval FGV (7.13 k)

Section B2: Programme specific – content of programme

10. Programme objectives, specializations and exit qualifications

Article 10.1 Programme objective

The objective of the programme is for students to acquire sufficient basic theoretical and practical knowledge and skills in the field of Mathematics and any related science disciplines to enable them to go on to pursue a Master's in Mathematics or a related science discipline, or to enter the job market. The programme also aims to impress upon the student the importance of the discipline in a broader scientific, philosophical and societal context.	Advice OLC; (7.13 a)

Article 10.2 Majors (specializations)

The programme has the following majors (for students enrolled in 2017 or earlier) 1 Algemene variant 2 Biomedische variant	Advice OLC; (7.13 a)

Article 10.3 Exit qualifications

Upon completing the Bachelor's programme in Mathematics, the student is expected	
A1 to have a thorough theoretical and practical knowledge of the main disciplines of mathematics at an internationally recognized Bachelor level; A2 to be aware of the interconnected, international and advancing character of mathematics, and of the role and applicability of mathematics in other sciences and in society; A3 (only applicable to students who followed the major Applied Mathematics) to be knowledgeable of at least one other scientific discipline in which mathematics plays an essential role (e.g. computer science, data science, econometrics and operations research, or biomedical science); B1 to be able to select and apply mathematical and computational techniques for answering quantitative questions, and to select appropriate mathematical models for solving problems from other scientific disciplines; B2 to be able to program a computer in a programming language and a number of mathematical software packages, in order to solve (applied) mathematical problems; B3 to possess the ability to manage a small research project and to perform mathematical or applied mathematical research under close supervision; C1 to be capable of strict reasoning in the way that is characteristic for mathematics, and in particular of giving mathematical proofs and abstractions; C2 to possess a critical and independent attitude towards the validity of mathematical argumentation, and towards the usage of mathematical models and techniques in science and engineering. D1 to be able to communicate about mathematics and its applications, both orally and in writing, to audiences with varying mathematical backgrounds; D1 to have the ability to acquire new mathematical knowledge, and to collect mathematical information, for example through the internet, literature study, or research; E2 to meet the entrance requirements for a Master's programme in Mathematics or Mathematics Education at a Dutch or foreign university, and to be able to make a	Approval OLC (7.13 c)

motivated choice for a further study and career.	

11. Curriculum structure

Article 11.1 Academic development

1. Academic development is part of the study programme. This includes: (1) Academic skills/critical reasoning (2) Methods & techniques (3) Philosophical training	Ordinance CvB, see appendix 3
2. These academic skills are covered in the following courses:	Advice OLC; (7.13 a)

Course code	Course component	EC
X_401104	Basic Concepts in Mathematics	6
X_400652	History of Science	3
XB_0006	Introduction to Mathematical Modelling	3
X_400629	Introduction to Programming (PYTHON)	3
XB_0007	Mathematical Modelling of Dynamical Systems	6
X_400433	Philosophy	3
X_400004	Statistics	6
X_400462	Wiskundig Modelleren 3	3

Article 11.2 Major

1. The major comprises a package of compulsory and possibly optional units of study.	Ordinance CvB, see appendix 3
2. In addition, units of study are categorized as introductory (100), in-depth (200) and advanced (300) level.	Ordinance CvB, see appendix 3

Article 11.3 Compulsory educational components of the major

A detailed description per educational component can be found in the Study Guide.

Year 1				Advice OLC; (7.13 a)
Name of educational component	**course code**	**nr of EC**	**level**	
Basic Concepts in Mathematics	X_401104	6	100	
Discrete Mathematics	XB_0008	6	100	
Group Theory	X_401105	6	200	
Introduction to Mathematical Modelling	XB_0006	3	100	
Introduction to Programming (PYTHON)	X_400629	3	100	
Linear Algebra	X_400638	6	100	
Mathematical Analysis	XB_0009	6	100	
Mathematical Modelling of Dynamical Systems	XB_0007	6	100	
Mentorship	X_000008	0	100	
Multivariable Calculus	XB_41008	6	100	
Probability Theory	X_400622	6	200	
Single Variable Calculus	XB_41007	6	100	

Year 2 (Algemene variant)				Advice OLC; (7.13 a)
Name of educational component	**course code**	**nr of EC**	**level**	
Complexe Analyse	X_400386	6	300	
Dynamische Systemen	X_400637	6	300	
Fourier Analysis	XB_0005	6	200	
Inleiding Programmeren (PYTHON)	X_400629	3	100	
Numerical Methods	X_401039	6	300	
Project Wiskunde	X_401106	6	300	
Ringen en Lichamen	X_400630	6	300	
Statistics	X_400004	6	200	
Topologie	X_400416	6	300	
Wiskundig Modelleren 3	X_400462	3	300	

Year 2 (Biomedische variant)				Advice OLC; (7.13 a)
Name of educational component	**course code**	**nr of EC**	**level**	
Biomedische Wiskunde	X_401056	6	300	
Dynamische Systemen	X_400637	6	300	
Fourier Analysis	XB_0005	6	200	
Inleiding Programmeren (PYTHON)	X_400629	3	100	
Medical (Patho)Physiology 1	X_436501	6	100	
Numerical Methods	X_401039	6	300	
Project Wiskunde	X_401106	6	300	
Statistical Data Analysis	X_401029	6	300	
Statistics	X_400004	6	200	
Wiskundig Modelleren 3	X_400462	3	300	

Year 3				Advice OLC; (7.13 a)
Name of educational component	**course code**	**nr of EC**	**level**	
Bachelorproject Wiskunde	X_400581	12	400	
History of Science	X_400652	3	200	
Philosophy	X_400433	3	200	

Article 11.4 Elective educational components of the major

Year 2 – Algemene variant (12 EC required)				Advice OLC; (7.13 a)
Name of educational component	**course code**	**nr of EC**	**level**	
Biomedische Wiskunde	X_401056	6	300	
Galoistheorie	XBU_417008	6	300	
Statistical Data Analysis	X_401029	6	300	

Year 2 – Biomedische variant (6 EC required)				Advice OLC; (7.13 a)
Name of educational component	**course code**	**nr of EC**	**level**	
Complexe Analyse	X_400386	6	300	
Topologie	X_400416	6	300	

Year 3 –Algemene Variant (12 EC required outside the minor)				Advice OLC; (7.13 a)
Name of educational component	**course code**	**nr of EC**	**level**	
Applied Analysis: Financial Mathematics	X_400076	6	400	
Bayesian Statistics	XBU_400468	6	400	
Biomedische Wiskunde	X_401056	6	300	
Chaotic Dynamical Systems	XBU_41003	6	300	
Differential Geometry (BSc)	X_400631	6	400	
Functional Analysis (BSc)	XBU_417013	6	400	
Galoistheorie	XBU_417008	6	300	
Markov Chains	XBU_418085	6	300	
Measure Theory	X_401028	6	300	
Number Theory	X_400632	6	400	
Partial Differential Equations (BSc)	X_400163	6	300	
Representatietheorie	XBU_417004	6	400	
Statistical Data Analysis	X_401029	6	300	
Workshop Mathematical Modelling	X_401062	6	400	

Year 3 –Biomedische Variant (12 EC required outside the minor)				Advice OLC; (7.13 a)
Name of educational component	**course code**	**nr of EC**	**level**	
Applied Analysis: Financial Mathematics	X_400076	6	400	
Bayesian Statistics	XBU_400468	6	400	
Chaotic Dynamical Systems	XBU_41003	6	300	
Complexe Analyse	X_400386	6	300	
Differential Geometry (BSc)	X_400631	6	400	
Functional Analysis (BSc)	XBU_417013	6	400	
Galoistheorie	XBU_417008	6	300	
Markov Chains	XBU_418085	6	300	
Measure Theory	X_401028	6	300	
Number Theory	X_400632	6	400	
Partial Differential Equations (BSc)	X_400163	6	300	
Ringen en Lichamen	X_400630	6	300	
Representatietheorie	XBU_417004	6	400	
Topologie	X_400416	6	300	
Workshop Mathematical Modelling	X_401062	6	400	

12. Electives

Article 12.1 Elective period

1. The first semester of the third year of the curriculum comprises elective educational components.	Ordinance CvB, see appendix 3

2.	For this elective period, the student can select: a. a minor (a coherent package of related courses) b. individual choice of at least five components at the faculty or elsewhere, of which at least two (12 EC) must be at level 300.	Ordinance CvB, see appendix 3
3.	Prior consent must be obtained from the Examinations Board.	Ordinance CvB, see appendix 3

Article 12.2 Minors

1.	The student who meets the admission requirements can take a 'University minor' without prior consent from the Examination Board. The 'University minors' are listed on the VU website.	Ordinance CvB, see appendix 3
2.	The student can select one of the following minors without prior consent from the Examination Board: o Algemene variant: a. The "verdiepende minor Wiskunde" b. The Education minor c. A University minor o Biomedische Variant: a. The "minor Biomedische Wiskunde" b. The minor Biomolecular and Neuro Sciences, track Neuro Sciences c. The Education minor d. A University minor The content of these minors can be found on the VU website.	Advice OLC; (7.13a)

The "verdiepende minor Wiskunde" consists of three courses from the list "Year 3 – Algemene Variant" in Article 11.4 and the following two components:

Compulsory components Verdiepende minor Wiskunde				Advice OLC; (7.13 a)
Name of educational component	**course code**	**nr of EC**	**level**	
Measure Theory	X_401028	6	300	
Workshop Mathematical Modelling	X_401062	6	400	

The "minor Biomedische Wiskunde" consists of one courses from the list "Year 3 – Biomedische Variant" in Article 11.4 and the following four components:

Compulsory components minor Biomedische Wiskunde				Advice OLC; (7.13 a)
Name of educational component	**course code**	**nr of EC**	**level**	
Introductie Medische Beeldbewerking	X_432630	6	300	
Measure Theory	X_401028	6	300	
Principles of Systems Biology	X_428566	6	300	
Workshop Mathematical Modelling	X_401062	6	400	

13. Honours programme

Article 13.1 Faculty Honours components

The components of the Honours programme offered by the faculty can be found on the VU website. This Honours programme comprises 30 EC, a minimum of 12 EC of which consist of faculty honours components and a minimum of another 12 EC consist of interfaculty honours components. The options available to the student will be published via the website www.vu.nl/nl/opleidingen/bacheloropleidingen/vu-honours-programme.

14. Binding recommendation on continuation of studies (BSA)

Article 14.1 Binding (negative) recommendation

1.	In order to obtain a positive recommendation on continuation of studies, the student must have obtained at least 42 EC of educational components from the bachelor's programme in Mathematics by the end of the first year of enrolment.	Advice OLC (7.13 f)
2.	Students who receive a binding negative recommendation on continuation of studies cannot enrol for the following Bachelor's programme(s) offered by the Faculty during the subsequent three academic years: Mathematics	Advice OLC (7.13 f)

15. Evaluation and transitional provisions

Article 15.1 Evaluation of the education

1.	The education provided in this programme is evaluated in accordance with the evaluation plan. The faculty evaluation plan offers the framework.	Approval OLC (7.13 a1)

Article 15.2 Transitional provisions

As a result of transitions and changes in the curriculum, it may not always be possible for a student to follow programme components exactly as stipulated in this document. In such cases, the Examination Board may grant permission to the student to depart from the Teaching and Examination Regulations, and follow equivalent courses as substitutes.	Advice OLC (7.13 a)

Advice and approval by the Programme Committee, on (date) January 31st 2018

Approved by the Faculty Joint Assembly, on (date) 26th June 2018

Adopted by the board of the Faculty of Science on 26th June 2018

Appendix I

Overview of articles that must be included in the OER

Based on Section 7.13, paragraph 2, of the WHW and other Sections of the Act.

Deel A: facultair deel

2. Study programme structure	
Article 2.1 Structure of academic year and educational components	7.13 paragraph 2 sub e
Article 2.2 Frame study programme	7.13 paragraph 2 sub a, e, x
3. Assessment and Examination	
Article 3.2 Type of examination	7.13 paragraph 2 sub h, l, j
Article 3.3 Oral interim examinations	7.13 paragraph 2 sub l, n
Article 3.4 Determining and announcing results	7.13 paragraph 2 sub o
Article 3.5 Examination opportunities	7.13 paragraph 2 sub h, j
Article 3.7 Exemption	7.13 paragraph 2 sub r
Article 3.8 Validity period for results	7.13 paragraph 2 sub k
Article 3.9 Right of inspection and post-examination discussion	7.13 paragraph 2 sub p, q
4. Honours programme	
Article 4.1 Honours programme	7.13 paragraph 2 sub v
5. Academic student counselling, advice regarding continuation of studies and study progress	
Article 5.1 Administration of study progress and academic student counselling	7.13 paragraph 2 sub u
Article 5.2 Advice regarding continuation of studies	7.13 paragraph 2 sub f
Article 5.3 Binding (negative) recommendation on continuation of studies (BSA)	7.13 paragraph 2 sub f
Article 5.4 Personal circumstances	7.13 paragraph 2 sub f
Article 5.5 Adaptations for students with a disability	7.13 paragraph 2 sub m

Section B1: Programme specific – general provisions

7. General programme information and characteristics	
Article 7.1 Study programme information	7.13 paragraph 2 sub i, r
Article 7.2 Teaching formats used and modes of assessment	7.13 paragraph 2 sub l, x
Article 7.3 Academic student counselling	7.13 paragraph 2 sub u
8. Further admission requirements	
Article 8.1 Additional previous education requirements	7.25, paragraph 4
Article 8.2 Colloquium doctum (entrance examination)	7.29, paragraph 2
9. Interim examinations and results	
Article 9.1 Sequence of interim examinations	7.13 paragraph 2 sub h, s, t
Article 9.2 Validity period for results	7.13 paragraph 2 sub k

Section B2: Programme specific – content of programme

10. Programme objectives, specializations and exit qualifications	
Article 10.1 Programme objective	7.13 paragraph 2 sub a
Article 10.2 Majors (specializations)	7.13 paragraph 2 sub a
Article 10.3 Exit qualifications	7.13 paragraph 2 sub b, c
11. Curriculum structure	
Article 11.1 Academic development	7.13 paragraph 2 sub a
Article 11.2 Major	7.13 paragraph 2 sub a
Article 11.3 Compulsory educational components of the major	7.13 paragraph 2 sub a
Article 11.4 Elective educational components of the major	7.13 paragraph 2 sub a
Article 11.5 Practical exercise	7.13 paragraph 2 sub d
Article 11.6 Participation in practical exercise	7.13 paragraph 2 sub d
12. Electives	

Article 12.1 Elective period	7.13 paragraph 2 sub a
Article 12.2 Minors	7.13 paragraph 2 sub a
13. Honours programme	
Article 13.1 Faculty Honours components	7.13 paragraph 2 sub a
14. Binding recommendation on continuation of studies (BSA)	
Article 14.1 Binding (negative) recommendation	7.13 paragraph 2 sub f
15. Evaluation and transitional provisions	
Article 15.1 Evaluation of the education	7.13 paragraph 2 sub a1
Article 15.2 Transitional provisions	7.13 paragraph 2 sub a

Appendix II *(translation to English at a later stage)*

Overzicht advies- en instemmingsrechten opleidingscommissie en facultaire gezamenlijke vergadering

Onderwerpen Onderwijs – en Examenregeling (OER) 7.13 lid 2 WHW	**FGV**		**OplC**	
	I	**A**	**I**	**A**
a. de inhoud van de opleiding en van de daaraan verbonden examens				
a1. de wijze waarop het onderwijs in de desbetreffende opleiding wordt geëvalueerd				
b. de inhoud van de afstudeerrichtingen binnen een opleiding				
c. de kwaliteiten op het gebied van kennis, inzicht en vaardigheden die een student zich bij beëindiging van de opleiding moet hebben verworven				
d. waar nodig, de inrichting van praktische oefeningen				
e. de studielast van de opleiding en van elk van de daarvan deel uitmakende onderwijseenheden				
f. de nadere regels, bedoeld in de Articleen 7.8b, zesde lid, en 7.9, vijfde lid *(BSA)*				
g. ten aanzien van welke masteropleidingen toepassing is gegeven aan Article 7.4a, achtste lid *(verhoogde studielast)*				
h. het aantal en de volgtijdelijkheid van de tentamens alsmede de momenten waarop deze afgelegd kunnen worden				
i. de voltijdse, deeltijdse of duale inrichting van de opleiding				
j. waar nodig, de volgorde waarin, de tijdvakken waarbinnen en het aantal malen per studiejaar dat de gelegenheid wordt geboden tot het afleggen van de tentamens en examens				
k. waar nodig, de geldigheidsduur van met goed gevolg afgelegde tentamens, behoudens de bevoegdheid van de examencommissie die geldigheidsduur te verlengen				
l. of de tentamens mondeling, schriftelijk of op een andere wijze worden afgelegd, behoudens de bevoegdheid van de examencommissie in bijzondere gevallen anders te bepalen				
m. de wijze waarop studenten met een handicap of chronische ziekte redelijkerwijs in de gelegenheid worden gesteld de tentamens af te leggen				
n. de openbaarheid van mondeling af te nemen tentamens, behoudens de bevoegdheid van de examencommissie in bijzondere gevallen anders te bepalen				
o. de termijn waarbinnen de uitslag van een tentamen bekend wordt gemaakt alsmede of en op welke wijze van deze termijn kan worden afgeweken				
p. de wijze waarop en de termijn gedurende welke degene die een schriftelijk tentamen heeft afgelegd, inzage verkrijgt in zijn beoordeelde werk				
q. de wijze waarop en de termijn gedurende welke kennis genomen kan worden van vragen en opdrachten, gesteld of gegeven in het kader van een schriftelijk afgenomen tentamen en van de normen aan de hand waarvan de beoordeling heeft plaatsgevonden				
r. de gronden waarop de examencommissie voor eerder met goed gevolg afgelegde tentamens of examens in het hoger onderwijs, dan wel voor buiten het hoger onderwijs opgedane kennis of vaardigheden, vrijstelling kan verlenen van het afleggen van een of meer tentamens				
s. waar nodig, dat het met goed gevolg afgelegd hebben van tentamens voorwaarde is voor de toelating tot het afleggen van andere tentamens				
t. waar nodig, de verplichting tot het deelnemen aan praktische oefeningen met het oog op de toelating tot het afleggen van het desbetreffende tentamen, behoudens de bevoegdheid van de examencommissie vrijstelling van die verplichting te verlenen, al dan niet onder oplegging van vervangende eisen				
u. de bewaking van studievoortgang en de individuele studiebegeleiding				
v. indien van toepassing: de wijze waarop de selectie van studenten voor een speciaal traject binnen een opleiding, bedoeld in Article 7.9b, plaatsvindt *(excellentietraject binnen een opleiding)*				
x. de feitelijke vormgeving van het onderwijs				
alle overige onderwerpen die in de OER zijn geregeld maar die niet als zodanig zijn genoemd in art. 7.13 WHW onder a t/m x.				

De lettering komt overeen met de lettering van Article 7.13 lid 2 WHW

Afkortingen:

FGV: Facultaire Gezamenlijke Vergadering
OplC: Opleidingscommissie
I: Instemmingsrecht
A: Adviesrecht

Appendix III

Ordinances VU Executive Board (CvB) and Binding Bachelor's Guidelines (Bachelor Richtlijn)

Deel A, Article:	Concerns:	CvB ordinance / guideline
2.1.1, 2.1.2	Year planning two semesters 8-8-4 (uniforme jaarkalender VU-UvA)	29-9-2008 (period 2009-2015) 22-05-2014 (periode 2016-2025)
2.1.3, 2.1.4	Fixed nr of EC	Bachelor-richtlijn, revised on 6 June 2017
2.2.1	Setup of the programme	Bachelor-richtlijn, revised on 6 June 2017
2.2.2, 2.2.3	Planning academic year (number of contact hours)	Bachelor-richtlijn, revised on 6 June 2017
2.2.4	Internationalization	CvB ordinance, following the advice of the Internationalization Board, in December 2008 and included in the IP
2.3	Language test Dutch (taaltoets)	Original ordinance in Jan 2009, reaffirmed 15-05-2012, included in the IP
3.1	Intekenen voor onderwijs en tentamens	CvB ordinance 30-09-2010, prior consent USR.
3.4.1	Determination and publication of the results (1)Grading deadline exams 10 workdays (2)theses 20 workdays	(1) Bachelor-richtlijn, revised on 6 June 2017 ((2) Quality demand 11 from the VU assessment policy, CvB ordinance 15-05-2012
3.5.1	Two possibilities to take examinations	Bachelor-richtlijn, revised on 6 June 2017
3.5.2	Retake Most recent grade is valid. A pass can be retaken	Taken from the UvA guidelines, as part of the harmonization, CvB ordinance 24-02-2014
3.5.4	Extra retake last year	Included in (prior) model OER 16-17 following a request from committee O&O and adopted by CvB op 27-10-2015
3.6	Grades	CvB ordinance 30-09-2010, with University council's consent. As a result of harmonization UvA, the guideline: 5.5 is a pass, has been added. CvB ordinance 24-02-2014.
4.1	Honours programme	Joint CvB ordinance UvA-VU, 28-10-2013
5.2.1	Recommendation on continuation of studies (BSA)	BSA kaderregeling ordinance CvB 18-01-2010, consent USR on OER 2016-2017 Kaderregeling revised on 12-09-2017
5.2.2	Formal warning before February 1st.	BSA kaderregeling ordinance CvB 18-01-2010, consent USR on OER 2016-2017 Kaderregeling revised on 12-09-2017
5.3	Binding (negative) study advice	BSA kaderregeling ordinance CvB 18-01-2010, consent USR on OER 2016-2017 Kaderregeling revised on 12-09-2017
11.1.1	Academische development	Bachelor-richtlijn, revised on 6 June 2017
11.2	Major	Bachelor-richtlijn, revised on 6 June 2017
12.1	Elective period (first semester, 3rd year)	Bachelor-richtlijn, revised on 6 June 2017
12.2.1	Participation in universityminor	CvB ordinance Profileringsruimte 22-11-2010

Appendix IV

Additional prior education requirements for students with a foreign diploma.

A student will meet the prior education requirements if his/her diploma includes mathematics at a level commensurate with Mathematics B as taught in Dutch pre-university programmes (VWO), including at least 7 of the following 10 topics:
a. Equations and inequalities
b. Functions and graphs
c. The derivative function
d. Exponents and logarithms
e. Trigonometric functions
f. Differential calculus
g. Exponential and logarithmic functions
h. Integral calculus
i. Trigonometry
j. Derivative and second derivative

The topics listed above are specified in greater detail below.

a. Equations and inequalities
• Quadratic Equations
• Higher order equations
• Equations with roots and fractions
• Systems of equations
b. Functions and graphs
• Linear functions
• Quadratic functions
• Change graphs (translations and multiplications)
• Root functions
• Fractional functions
c. The derivative function
• Increment graphs
• The differential quotient
• Tangents and rates of change
• Limit and derivative
• Applications of the derivative (rate)
d. Exponents and logarithms
• The standard function
• Exponential growth
• Logarithms
• Applications of logarithms
e. Trigonometric functions
• Unit circle and radial
• Trigonometric equations
• Sinusoidal transformations
• Plotting sinusoids
f. Differential calculus
• The derivative of fractional functions (product rule and quotient rule)
• The derivative of power functions
• The chain rule
• Tangents and apexes
• Apexes and intersections
g. Exponential and logarithmic functions
• Logarithmic and exponential equations
• Graphs of exponential and logarithmic functions
• Base e

• The natural logarithm
h. Integral calculus
• Riemann sums and integrals
• Surfaces and volumes (in revolutions around the X axis)
• Reduced functions
• Applications of integrals
i. Trigonometry
• Trigonometric formulas
• Differentials of trigonometric functions
• Reducing trigonometric functions
j. Derivative and second derivative
• The second derivative
• Applications of the second derivative
• Tangents in graphs
• Tangentials and perpendicular intersections

An exemption from the required similarity in topics covered as provided here may be granted if the level of mathematics is demonstrably higher than Mathematics B at a Dutch pre-university school (VWO).