

Teaching and Examination Regulations

Masterprogramme in Stochastics and Financial Mathematics Faculty of Science

Academic year 2018-2019

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

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Section B1: Programme specific – general provisions

6. General programme information and characteristics

Article 6.1 Study programme information

1.	The programme Stochastics and Financial Mathematics CROHO number 60801 is offered on a full-time, part-time basis.	Advice OLC; approval FGV (7.13 i)
1a.	The language of instruction is English	Advice OLC; approval FGV (9.38 b)
2.	A unit of study comprises 3 EC or a multiple thereof. The units offered by Mastermath may have a different size (8 EC).	

Article 6.2 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)

7. Further admission requirements

Article 7.1 Intake date(s)

Lid 1	The programme starts twice a year: on September 1 and on February 1.	Advice OLC; approval FGV (9.38 b)
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Article 7.2 Admission requirements

1.	Admission to the Master's programme is possible for an applicant who has obtained a Bachelor's degree at an institution of academic higher education, which demonstrates the following knowledge, understanding and skills: <ol style="list-style-type: none"> equivalent to a Bachelor's degree in Mathematics or Technical Mathematics or (with sufficient mathematical content) in Business Analytics or Econometrics or Actuarial Sciences, and whose English-language proficiency is at least equivalent to pre-university final exam level (VWO in the Netherlands). An applicant with a university degree in a field other than specified in part a may be admitted to the programme if the following conditions are met: The applicant's prior education, including any supplementary work, contains at least 90 credits of mathematics, The applicant has reached a final attainment level in stochastics equivalent to the Bachelor's degree in Mathematics as taught at the Vrije Universiteit Amsterdam. The applicant's prior education meets the qualification of a university Bachelor's degree programme as defined in the Dublin descriptors. The applicant's English language proficiency is at least equivalent to pre-university final exam level (VWO in the Netherlands). 	Partly legal provision & ordinance CvB, see appendix 3. Admission requirements excepted from participation in WHW
c.	The Admissions Board will investigate whether the applicant meets the admission requirements.	Legal provision

Article 7.3 English language requirement for English-language Master's programmes

<p>1. The proficiency requirement in English as the language of instruction can be met if no longer than two years before the start of the programme, the applicant has successfully completed one of the following examinations with at least the scores indicated:</p> <ul style="list-style-type: none"> - IELTS: 6.5 - TOEFL paper based test: 580 - TOEFL internet based test: 92 - Cambridge Advanced English: A, B or C. 	Landelijke gedragscode Internationale studenten
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Article 7.4 Pre-Master's programme

1. Students with a Bachelor's degree in a field that corresponds to a sufficient extent with the subject area covered by the Master's programme can request admission to the pre-Master's programme.	advies OLC; instemming FGV (9.38 b)
2. The pre-Master's programme comprises 30 EC and is made up on an individual basis.	advies OLC; instemming FGV (9.38 b)
3. A successfully completed pre-Master's programme serves as proof of admission to the specified Master's programme in the subsequent academic year.	advies OLC; instemming FGV (9.38 b)

8. Interim examinations and results

Article 8.1 Sequence of interim examinations

1. Before starting the Master Project Stochastics and Mathematics (XM_400502), the student must have earned all other programme credits. A shortfall of 6 credits is permissible.	Advice OLC; approval FGV (7.13 h, s & t)
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Article 8.2 Validity period for results

As laid down in article 3.8	Advice OLC; approval FGV (7.13 k)
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Article 8.3 Degree

Degree Students who have successfully completed their Master's final Examination are awarded a Master of Science degree. The degree awarded is stated on the diploma.

Section B2: Programme specific – content of programme

9. Programme objectives, specializations and exit qualifications

Article 9.1 Workload

1. The programme has a workload of 120 EC	Advice OLC; (7.13 a)
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Article 9.2 Specializations

The programme has no specializations.	Advice OLC; (7.13 a)
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Article 9.3 Programme objective

The programme aims are for the student to acquire sufficient knowledge, skills and insight within the field of Stochastics and Financial Mathematics, and any related disciplines, to be able to operate as an independent professional at an academic level, and to be a suitable candidate for a subsequent course of study leading to a career in research or development. Another aim of the programme is to develop students' understanding of the interrelationships between academic disciplines, as well as their sense of social responsibility.	Advice OLC; (7.13 a)
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Article 9.4 Exit qualifications

<p>The graduate:</p> <ul style="list-style-type: none"> • has thorough theoretical and practical knowledge of the fields of Modern Probability, Statistics and Stochastic Operations Research and their application in financial mathematics, the life sciences or in industry, for example; • has insight into the development and the heuristics of modern mathematics, especially Stochastics, and has gained research experience in an area of Stochastics; • is capable of becoming conversant in other sub-fields of Stochastics within a reasonable period of time; • is capable of formulating a plan for a research project based on a broad research question; • is capable of analysing and formulating research results, and of drawing conclusions from them; • is capable of writing a report and of participating in a discussion on a topic related to the field of study; • is capable of studying the professional literature (including international publications) in relevant sub-fields, and of utilizing the relevant content; • is capable of applying knowledge of Stochastics in a broader (multidisciplinary) context, and has experience of using probabilistic models to examine problems in fields such as economics, biology or physics; • has sufficient knowledge of, and insight into, the social role of Stochastics and Financial Mathematics to decide on a responsible choice of profession and professional practice; • is capable of cooperating with others, of imparting knowledge to others, and of delivering a lecture both to specialists and to a wider audience. 	Approval OLC (7.13 c)
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<p>The graduate who focuses on scientific research is able to:</p> <ul style="list-style-type: none"> • study and combine mathematical literature from various sources, and augment the field of mathematics with contributions of their own; • contextualize the results and conclusions obtained, within the framework of results obtained by others. <p>The graduate who focuses on applications of Stochastics in a business setting or for an organization is able to:</p> <ul style="list-style-type: none"> • define a solution-based scientific question from problems of a quantitative and/or stochastic nature in the organization or business; • implement such questions in the form of targeted research; • interpret and present data obtained from analyses conducted on different scales and at various levels of abstraction. 	
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10. Curriculum structure

Article 10.1 Composition of the programme

1. The programme comprises at least a package of compulsory components and an individual Master's thesis or academic internship.	Ordinance CvB, see appendix 3
2. Additionally the programme can offer: - Practical exercises - Electives	Advice OLC; (7.13 a)
3. Educational components are categorized as specialized (400), research oriented (500) and highly specialized (600) level.	Ordinance CvB, see appendix 3

Article 10.2 Compulsory educational components

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

Educational component	course code	nr of EC	level	Advice OLC; (7.13 a)
Master Project Stochastics and Financial Mathematics	XM_400502	36	600	
Measure Theoretic Probability	X_400244	8	400	
Master Seminar Stochastics and Financial Mathematics		3	400	
Scientific Writing in English	X_400512	3	400	

Article 10.3 Elective educational components

Students may choose elective courses subject to restrictions. They must choose at least 2 Advanced SFM courses, and 2 Financial Mathematics courses. The remaining electives must be chosen from the list of Designated SFM courses. Students are free to choose at most 12 EC of other electives (for example outside Mathematics).

Constrained choice Financial Mathematics 2 out of 4 (12 EC required)				Advice OLC; (7.13 a)
Name of educational component	course code	nr of EC	level	
Interest Rate Models	X_418091	6	500	
Portfolio Theory	X_400535	6	500	
Stochastic Processes for Finance	X_400352	6	400	
Computational Finance	XMU_418045	6	400	

Constrained choice Advanced SFM course (at least 2)				Advice OLC; (7.13 a)
Name of educational component	course code	nr of EC	level	
Advanced Machine Learning	XM_0010	6	400	
Advanced Topics in Stochastic Analysis		6		
Data-drive Decision Making in Operations Research		6		
Interest Rate Models	X_418091	6	500	
Portfolio Theory	X_400535	6	500	
Queues and Levy Fluctuation Theory	XMU_0002	6	400	
Statistical Theory for High-and Infinite Dimensional Models	XMM_0008	8	500	
Stochastics Networks				
Stochastic Simulation	XMU_0001	6	400	

Designated SFM courses				Advice OLC; (7.13 a)
Name of educational component	course code	nr of EC	level	
Mastermath courses				
Asymptotic Statistics	X_400323	8	500	
Bayesian Statistics		8	500	
Forensic Probability and Statistics	XMM_0005	8	400	
Functional Analysis	X_400328	8	500	
Heuristic Methods in Operations Research	X_418006	6	400	
Machine Learning Theory	XMM_0002	8	400	
Partial Differential Equations	X_400330	8	500	
Percolation: from Introduction to Frontiers of Current Research	XMM_0012	8	500	
Probabilistic and Extremal Combinatorics	X_418118	8	400	
Statistical Theory for High- and Infinite-Dimensional Models	XM_0008	8	500	
Stochastic Differential Equations	X_400454	6	500	
Stochastic Processes	X_400339	8	400	
VU local courses				
Advanced Machine Learning	XM_0010	6	400	
Applied Analysis: Financial Mathematics	X_00076	6	400	
Applied Stochastic Modeling	X_400392	6	400	
Entrepreneurship in Data Science and Analytics	X_405122	6	400	
Optimization of Business Processes	X_400422	6	400	
Performance of Networked Systems	X_405105	6	400	
Statistical Models	X_400418	6	400	
Statistics for Networks	X_405110	6	600	
Stochastic Optimization	X_400336	6	400	
Stochastic Processes for Finance	X-440352	6	400	
UvA local courses				
Advanced Topics in Stochastic Analysis		6		
Data-drive Decision Making in Operations Research		6		
Internship Stochastics and Financial Mathematics		3		

Interest Rate Models	X_418091	6	500	
Portfolio Theory	X_400535	6	500	
Queues and Levy Fluctuation Theory	XMU_0002	6	400	
Reading Course Mathematics				
Simulation Methods in Statistics	X_400258	6	400	
Stochastic Integration	X_400470	8	400	
Stochastic Networks		6		
Stochastic Simulation		6		
From other programmes (Msc Comp. Sc.)				
Computational Finance	XMU_418045	6	400	

[\[Optional\] Article 10.4 Practical exercise](#)

The following components can be considered as practical exercises:				Approval OLC (7.13 d)
Name of educational component	course code	nr of EC	level	

[Article 10.5 Participation in practical exercise](#)

In the case of a practical training, the student must attend at least ... % of the practical sessions. Should the student attend less than ... %, he/she must repeat the practical training, or the Examinations Board may have one or more supplementary assignments issued.	Approval OLC (7.13 d)
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11. Evaluation and transitional provisions

[Article 11.1 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)
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[Article 11.2 Transitional provisions](#)

By way of departure from the Teaching and Examination Regulations currently in force, the following transitional provisions apply for students who started the programme under a previous set of Teaching and Examination Regulations:	Advice OLC (7.13 a)
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Advice and approval by the Programme Committee, on June 22, 2018.

Approved by the Faculty Joint Assembly, on June 22, 2018.

Adopted by the board of the Faculty of Science on June 22, 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.

Section A: Faculty section

2. Study programme structure	
Article 2.1 Structure of academic year and educational components	7.13 paragraph 2 sub e
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. Academic student counselling and study progress	
Article 4.1 Administration of study progress and academic student counselling	7.13 paragraph 2 sub u
Article 4.2 Adaptations for students with a disability	7.13 paragraph 2 sub m

Section B1: Programme specific – general provisions

6. General programme information and characteristics	
Article 6.1 Study programme information	7.13 paragraph 2 sub i, r
Article 6.2 Teaching formats used and modes of assessment	7.13 paragraph 2 sub l, x
[option:] Article 6.3 Academic student counselling	7.13 paragraph 2 sub u
7. Further admission requirements	
Article 7.2 Admission requirements	7.30b paragraph 2
8. Interim examinations and results	
Article 8.1 Sequence of interim examinations	7.13 paragraph 2 sub h, s, t
[option 1:] Article 8.2 Validity period for results	7.13 paragraph 2 sub k
[option 2:] Article 8.2 Validity period for results	7.13 paragraph 2 sub k

Section B2: Programme specific – content of programme

9. Programme objectives, specializations and exit qualifications	
Article 9.1 Workload	7.13 paragraph 2 sub g
Article 9.2 Specializations	7.13 paragraph 2 sub a
Article 9.3 Programme objective	7.13 paragraph 2 sub a
Article 9.4 Exit qualifications	7.13 paragraph 2 sub b, c
10. Curriculum structure	
Article 10.1 Composition of the programme	7.13 paragraph 2 sub a
Article 10.2 Compulsory educational components	7.13 paragraph 2 sub a
[Optional] Article 10.3 Elective educational components	7.13 paragraph 2 sub a
[Optional] Article 10.4 Practical exercise	7.13 paragraph 2 sub d
Article 10.5 Participation in practical exercise	7.13 paragraph 2 sub d
11. Evaluation and transitional provisions	
Article 11.1 Evaluation of the education	7.13 paragraph 2 sub a1
Article 11.2 Transitional provisions	7.13 paragraph 2 sub a

Appendix II

Table of right of advice and right of approval by the OLC and FGV
(translation to English at a later stage)

Onderwerpen Onderwijs – en Examenregeling (OER) 7.13 paragraph 2 WHW	FGV		OpIC	
	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 paragraph, en 7.9, vijfde paragraph (BSA)				
g. ten aanzien van welke masteropleidingen toepassing is gegeven aan Article 7.4a, achtste paragraph (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 <u>binnen een opleiding</u>)				
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 paragraph 2 WHW

Appendix III

Ordinances VU CvB and Binding Guidelines (richtlijn)

Section 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	Educational components	Richtlijn Bachelor en Masteronderwijs, revised on 6 June 2017
3.1	Compulsory signing up	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) Richtlijn Bachelor en Masteronderwijs, 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 per year	Richtlijn Bachelor en Masteronderwijs, 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.
Section B1, article:	Concerns:	CvB ordinance / guideline
7.2.1	Admission criteria; at least WO Bachelor's degree	Richtlijn Bachelor en Masteronderwijs, revised on 6 June 2017
7.2.3	Additional admission criteria; type of criteria	Richtlijn Bachelor en Masteronderwijs, revised on 6 June 2017
Section B1, article:	Concerns:	CvB ordinance / guideline
10.1	Composition programme	Richtlijn Bachelor en Masteronderwijs, revised on 6 June 2017
10.2	Categorization of components	Richtlijn Bachelor en Masteronderwijs, revised on 6 June 2017