OFFICIAL TRANSLATION OF

**Fachspezifische Bestimmungen
für den Masterstudiengang Mathematics
der Fakultät für Mathematik, Informatik
und Naturwissenschaften**

Vom 26. Januar 2011 und vom 6. Juli 2011
(Amtlicher Anzeiger Nr. 31 vom 20. April 2012)

**THIS TRANSLATION IS FOR INFORMATION ONLY –
ONLY THE GERMAN VERSION SHALL BE LEGALLY
VALID AND ENFORCEABLE!**

**Subject-Specific Provisions for the Master of Science in
Mathematics
Offered by the Faculty of Mathematics, Informatics and
Natural Sciences**

Dated 26 January 2011 and 6 July 2011

On 1 August 2011 in accordance with Section 108 subsection 1 of the Hamburg higher education act (Hamburgisches Hochschulgesetz, HmbHG), the Executive University Board of Universität Hamburg ratified the Subject-Specific Provisions that were adopted by the Faculty Council from the Faculty of Mathematics, Informatics and Natural Sciences on 26 January 2011 and 6 July 2011 in accordance with Section 91 subsection 2 no. 1 HmbHG dated 18 July 2001 (HmbGVBl. p. 171) as amended on 16 November 2010 (HmbGVBl. p. 605) for the master's degree program in mathematics as a subject of a degree program with the designation Master of Science (MSc).

Preamble

These Subject-Specific Provisions supplement the Examination Regulations of the Faculty of Mathematics, Informatics and Natural Sciences dated 26 October 2005 as amended governing Master of Science (MSc) degree programs and provide a description of the modules for the subject of mathematics.

I.

Supplemental provisions

Section 1
Program and examination objectives, academic degree, and implementation of the degree program

Section 1 subsection 1:
1. The Master of Science in Mathematics has a strong emphasis on research.
2. The successful completion of the master's examination in mathematics is evidence of the mastery of an in-depth and research-focused academic education in a degree program that constitutes a professional qualification.
3. The program is designed to provide students with the ability to address complex problems and solve them using available scientific methods as well as methods that extend beyond the current state of the art.
4. Taking into consideration the requirements and changes in the working world and interdisciplinary relationships, the program teaches students the requisite technical methods, skills, and knowledge and also enables them to work scientifically, apply and critically classify scientific findings, and act responsibly.
5. A master's degree in mathematics enables students to apply to a doctoral degree program for mathematics. The doctoral degree regulations shall govern this in more detail.

Program objectives principally focus on:
1. Expertise focused on current research questions and based on a mastery of basic knowledge
2. Methodological and analytical competencies that enable students to independently expand scientific knowledge, wherein research methods are the primary focus
3. Teaching specialized versatility and advanced scientific knowledge in order to be able to analyze and solve problems that have never before been addressed in the areas of mathematical research
4. The ability to independently and responsibly analyze current mathematical research issues from an interdisciplinary perspective while focusing on the problem and to conclusively present results
5. Teaching core skills that are professionally relevant

Section 1 subsection 4:
The Faculty of Mathematics, Informatics and Natural Sciences shall administer this degree program.

Section 4
Program and exam organization, modules, and ECTS credits

Section 4 subsections 2 and 3:
1. The master's degree program is organized into two one-year long stages—the advanced phase and the research phase:
   – The one-year long advanced phase serves to develop specialized knowledge necessary for independent, productive work in mathematics. It is comprised of advanced modules (= required elective modules) that are concentrated on the research areas of the Department of Mathematics. Modules totaling 60 ECTS credits must be successfully completed. The following prerequisites must be satisfied:
      • Modules amounting to no more than 18 ECTS credits may be selected from the catalog of courses for advanced modules offered by the Department of Mathematics for a bachelor's degree program, provided that these courses were not already previously taken in the bachelor's degree program.

The following is recommended:
      • At least one advanced module should be selected from the research area that will be the topic of the master's thesis.
   – The one-year long research phase is comprised of three modules and must be viewed as an inseparable component with respect to content. The induction project and the preparatory project each encompass 15 ECTS credits and are component parts of the third subject semester. The projects will familiarize students with the current state of research and special methods in the field from which the topic for the master's thesis will be selected. Subsequently in the fourth semester, the master's thesis will be written over a period of six months and is worth 30 ECTS credits. Students must demonstrate with this work that under guidance they are capable of handling a specified issue from the current field of mathematical research in accordance with scientific methods as well as present and interpret the problem, the means of solution, and the solution logically and comprehensibly. The beginning of the research phase must be noted in the student's academic file and include the following: start date, field of research, and supervisor.

2. Students must complete two seminars that require giving a presentation.

A description of all mathematical modules can be found in Appendix A to the Subject-Specific Provisions for the Master of Science in Mathematics—Module Table as well as in the module course catalog for the Master of Science in Mathematics, which supplements these Subject-Specific Provisions.

Subject Semester	Study Phase	Modules	Type	ECTS Credits
1	Advanced phase	Advanced Specialization Seminars Research seminars Guided independent study	Required elective	60
2				
3	Research phase	Induction project	Required	15
		Preparatory project		15
4		Master's thesis		30

Section 4 subsection 5 Part-time degree

The Master of Science in Mathematics may be completed on a part-time basis. Students can apply to study part-time with Services for Students (SfS). The decision about whether to approve a part-time student enrollment application shall be made in accordance with the legal provisions set forth in Universität Hamburg's enrollment rules and regulations, as amended. Part-time students must inform the Examinations Office without delay of any changes to their student status (written confirmation from Services for Students required). The Examinations Office will note the change of status in the file. An individual course plan will be devised for part-time students in consultation with the Examinations Board as a part of subject advising.

Section 4 subsection 6 Commencement of studies

The master's degree program shall commence on the first day that lectures are held. The program may be started at any time up to two weeks after lectures have begun.

Section 5
Course types

Section 5 sentence 2:

All course types pursuant to Section 5 of the Examination Regulations for Master of Science degree programs may be implemented. It is customary to combine lectures and small group work such as practical courses and presentation seminars in the advanced phase as well as project- and research-related seminars in the research phase. Another type of course is guided independent study in which an individual problem is worked on under guidance.

Section 5 subsection 3:

As a rule, courses are taught in English.

Section 6
Limiting attendance for specific courses

The number of participants for specific courses may be limited in order to implement the course properly. Limitations and criteria for the selection of participants must be published either in the module course catalog or by posting reasonable notice thereof prior to the registration period.

Section 10
Deadlines for module examinations
and retaking module examinations

Section 10 subsection 6 Retaking module examinations:

In justified exceptional cases, the Examinations Board may prescribe a different type of examination for a student's second attempt at passing an examination or course examination, which has not been previously passed, upon a student's request therefor.

Section 13
Completed coursework and module examinations

Section 13 subsection 4:

(1) An academic debate in combination with a presentation, where appropriate, may be used as an additional type of examination.

(2) The specific type and duration or scope of the examination shall be announced at the beginning of the course.

(3) Oral examinations may be used as an alternative to written examinations for module examinations. Written examinations may be used as an alternative to oral examinations for module examinations. The Examinations Board responsible may approve other alternative forms of examination.

Section 13 subsection 5:

Examinations shall be held in either German or English. As a rule, an examination shall be held in the language in which the course was conducted. If the examiner and the student agree, the examination may also be taken in a language that is different from the language of the module.

Section 14
Master's thesis

Section 14 subsection 1:
A colloquium is a mandatory component of the master's thesis module.

Section 14 subsection 2 sentence 1:
Students who have earned at least 72 ECTS credits in total may be allowed to commence work on the master's thesis.

Section 14 subsection 6 sentence 2:
The master's thesis may be written in either English or German, which must be agreed upon by both the student and the supervisor.

Section 14 subsection 7 sentence 2:
The amount of work involved for the master's thesis amounts to 30 ECTS credits. The master's thesis must be completed within six months.

Section 15
Evaluation of examinations

Section 15 subsection 3 sentence 5:
If a module examination is comprised of several course examinations, then the module grade shall be calculated by averaging the individual grades from each of the course examinations.

Section 15 subsection 3 sentence 9:
The overall grade for the master's degree program shall be calculated on the basis of the average of grades from the module final examinations weighted according to the ECTS credits assigned to them and the grade for the master's thesis.

Section 15 subsection 3 sentence 10:
The following shall apply to the module for the INDUCTION PROJECT and seminars: There shall be no differentiation of examination grades. Examination performance shall not be used to calculate the overall final grade.

Section 15 subsection 4:
The overall final grade "passed with distinction" shall be awarded if a grade of 1.0 is earned for the master's thesis and the average grade from all module examinations is not less than 1.3.

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II.

Module descriptions

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Descriptions of all of the modules can be found in Appendix A to these Subject-Specific Provisions and in the module course catalog.

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Section 23
Effective date

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These Subject-Specific Provisions shall become effective on the day after they are ratified by the Executive University Board of the University. They shall first apply to students commencing their studies in the Winter Semester 2009/10.

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Hamburg, 1 August 2011
Universität Hamburg

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Appendix A to the Subject-Specific Provisions for the Master of Science in Mathematics—Module Table

Recommended Semester	Frequency	Duration (1 or 2 semesters)	Reference Semester	Module Type: Required (Req.), Required Elective (RE), or Elective (E)	Module Number/Code	Module Prerequisites	Courses		Type of Course	Credit Hours per Week	Examinations		Graded	ECTS Credits
							Module	Course Title			Examination Prerequisites	Type of Examination		
Advanced Phase Semesters 1 and 2: Registration for required elective modules, Advanced (A), Specialization (SP), Seminar (S), Research seminar (RS), Guided independent study (GIS), totaling 60 ECTS credits. You will find detailed descriptions of current modules available in the module course catalog.														
Starting in the 1st	Winter and summer semesters	1	-	RE	A	-	**Advanced**				In accordance with the module description	Oral examination	Yes	12
								Lecture	L	4				or
								Practical courses tied to lecture	PC	2				
							or	Lecture	L	2				6
								Practical courses tied to lecture	PC	1				
Learning objectives: Students will have developed advanced knowledge of the scientific state of research in the subject areas from the Department of Mathematics' fields of research and be able to apply advanced scientific methods that are used in the areas of research. They will have gained experience and practice using technical literature.														
Starting in the 1st	Winter and summer semesters	1	-	RE	SP		**Specialization**				In accordance with the module description	Oral examination	Yes	18
								Lecture	L	4				or

							Course					Exam	Graded	CP
							Practical courses tied to lecture	PC	2					
						or	Lecture	L	2					9
							Practical courses tied to lecture	PC	1					

Learning objectives:
Students will have gained an in-depth understanding of selected problems, methods, and findings from a field of work in mathematics. They will have mastered advanced techniques from the field and developed the ability to produce independent scientific work in the field.

Starting in the 1st	Winter and summer semesters	1	-	RE	S		**Seminar**				Presentation	No	6
							Seminar	S	2					

Learning objectives:
Students are able to independently address an advanced mathematical topic, present their results in a presentation, and lead a technical discussion.

Starting in the 1st	Winter and summer semesters	1	-	RE	RS	-	**Research seminar**				Presentation and academic debate or academic debate without a presentation	No	6
													2
							Research seminar	RS	2					

Learning objectives:
Students will be able to participate in the research activities of a mathematical working group with increasing independence. Within the framework of a working group, they will have learned to address current mathematical topics of interest and in as far as possible extended the state of knowledge found in the research literature through their independent work. They will be able to present current research findings and unresolved issues in presentations and lead scientific discussions in the working group.

Starting in the 1st	Winter and summer semesters	1	-	RE	GIS		**Guided independent study**				Dependent on the formulation of the problem, a type of examination pursuant to Section 13 subsection 4 of the General Examination Regulations (Rahmenprüfu	Yes	2–9

											ngsordnung, RPO)		
							Guided independent study	GIS					

Learning objectives:
Induction in a special mathematical topic and mastery of special mathematical techniques

Research phase
Semesters 3 and 4: Registration for the modules IP, PP, and MT. You will find detailed descriptions of current modules available in the module course catalog.

3rd	Winter and summer semesters	1	3	Req.	IP		**Induction project**				Dependent on the formulation of the problem, a type of examination pursuant to Section 13 subsection 4 of the General Examination Regulations (Rahmenprüfungsordnung, RPO)	No	15
							Induction project	GIS/L /PC/ S/ RS					

Learning objectives:
The induction project serves to provide students with a deeper understanding of a current area of research from which the topic of the master's thesis should be derived and it is also intended as a way for students to examine and become familiar with the most current scientific literature. Students will have learned to independently collect requisite background information and address a specialized topic. Students must join a working group for this module. As part of a working group, students will have learned teamwork and how to optimally use informal knowledge from related fields.

3rd	Winter and summer semesters	1	3	Req.	PP	Participation in the induction project	**Preparatory project**				Dependent on the formulation of the problem, a type of examination pursuant to Section 13 subsection 4 of the General	Yes	15

											Examination Regulations (Rahmenprüfungsordnung, RPO)		
						Preparatory project	GIS/L / PC/ S/RS						

Learning objectives:
In solving preparatory problems, students should develop special methods and knowledge of an area to such an extent that they are able to successfully apply these to solving problems that will serve as the basis for the topic of the master's thesis. Planning and structuring the intended research project. Students must join a working group for this module. As part of a working group, students will have learned teamwork and how to optimally use informal knowledge from related fields.

4th	Winter and summer semesters	6 months	4	Req.	MT	Students who have earned at least 72 ECTS credits in total may be allowed to commence work on the master's thesis.	**Master's thesis**				See Section 14	Yes	30
							Master's thesis						

Learning objectives:
The master's thesis should demonstrate that the candidate is able to address a current research issue from the discipline within the prescribed time frame, apply appropriate scientific methods with increasing independence, and present the findings in a suitable academic form.