The Departmental Council of the Department of Mathematics and Computer Science of Philipps-Universität Marburg, in accordance with §50(1) Hesse Higher Education Act (HessHG), as amended on 14 December 2009 (Law Gazette of the State of Hesse (GVBl.) I No. 22/2009, p. 666), most recently amended by Article 1 Act of 14 December 2021 (GVBl., p. 931) on 25 January 2023 has adopted the following Degree Program and Examination Regulations:

Degree Program and Examination Regulations

for the program in

"Business Mathematics"

leading to the degree of

"Master of Science (M.Sc.)"

at Philipps-Universität Marburg

25 January 2023

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I. General

§1 Scope

These Degree Program and Examination Regulations supplement the General Regulations for Master's Degree Programs at Philipps-Universität Marburg of 13 September 2010 (Official Bulletin of Philipps-Universität Marburg, No. 52/2010) as amended from time to time – hereinafter referred to as the General Regulations – and regulate the objectives, content, structure and organization of the degree program as well as the requirements and procedures for the examination grades in the degree program "Business Mathematics" with the degree "Master of Science (M.Sc.)".

§2 Goals of the degree program

Upon completion of the master's degree program in "Business Mathematics", graduates possess the necessary professional knowledge, skills and methods of business mathematics, taking into account the requirements and changes in the professional world (business, industry, public service) and interdisciplinary references, to work independently in accordance with scientific principles at an advanced level, to analyze and critically assess modern scientific knowledge. They have deepened and broadened the knowledge and skills they acquired in their bachelor's degree and have an overview of specialist contexts in business mathematics.

Through individual focus, the study of current research literature and the preparation of an individual master's thesis in which a business mathematics problem is scientifically investigated and an approach to a solution is developed, graduates have acquired specialized knowledge and skills. Together with the study of several practice-oriented application subjects, this enables them to understand and analyze deeper problems from the real world.

Graduates of the master's program in business mathematics are not limited to a fixed job description, also due to their ability to abstract and their trained conceptual, analytical and logical thinking. They have acquired the necessary skills

- to perform independent mathematical work in industry, business and the public sector, especially at banks and insurance companies
- to manage projects that involve analyzing, modeling and solving scientific or business problems.
- to handle planning and development tasks at scientific and public institutions
- to work as a research assistant or research associate at a university
- to access a doctoral degree program.

§3 Master's degree

(1) The master's degree examination is passed if all modules provided for in accordance with §6 have been passed.

(2) After successfully completing the program in accordance with paragraph 1, the Department of Mathematics and Information Technology will award the academic degree of "Master of Science (M.Sc.)".

II. Program-related rules

§4 Access requirements

(1) The general admission requirement for the master's degree program is proof of completion of the specific bachelor's degree program in Business Mathematics, proof of completion of a relevant bachelor's degree program in the field of Mathematics, or proof of a comparable domestic or foreign university degree with professional qualifications.

In addition to the bachelor's degree in Business Mathematics or Mathematics, a degree for the teaching profession at secondary schools (First State Examination or master's degree) with mathematics as a teaching subject entitles the student to admission. A bachelor's degree in another discipline qualifies for admission if at least 90 credits in business mathematics modules have been completed as part of this or another degree program. At least 42 credits (LP) should be allocated to modules that correspond to the objectives and competencies of the following modules: Foundations of Mathematics, Linear Algebra I, Linear Algebra II, Analysis I and Analysis II. In addition, skills in stochastics, measurement and integration theory, optimization, and numerics should have been acquired. Furthermore, at least 18 credits should have been completed in business and economics modules.
If no degree certificate with an overall grade is available by the application deadline, enrollment may be conditional. The prerequisite for an underlying bachelor's degree with a scope of 180 credits is that proof be provided that module examinations or partial module examinations have been passed representing at least 80% of the credits required for the bachelor's degree in question. The proof must contain an average grade that was determined on the basis of the graded module examinations and partial module examinations within the scope of the proven 80% of the credits required for the bachelor's degree. Enrollment can only take place under the proviso that all coursework and examination grades of the bachelor's degree have been completed before the start of the master's degree (deadline 31 March if the master's degree program starts in the summer semester or deadline 30 September if the master's degree program starts in the winter semester) and that proof of the degree certificate is provided by the end of the lecture period of the first subject semester.

(2) The examination committee (§16) will decide on the question of the relevance of the prior degree programs as defined in paragraph 1.

(3) The examination committee (§ 16) shall decide on the question of the comparability of the university degree within the meaning of paragraph 1.

(4) The examination committee (§16) may link admission to the condition that additional coursework grades and/or examination grades representing a maximum of 30 credits be completed. In this case, the degree program may be extended accordingly.

(5) The modules and courses of the degree program will generally be offered in English. A German-language offering will be possible on an exceptional basis if all students in the module or course wish this. The coursework and examinations can be taken in either German or English, at the student's discretion. Optional offerings and elective courses may include import modules in German from bachelor's degree programs or other departments so that the choice may be limited here, if necessary.
The specific admission requirements are: Demonstrating either:

a) English language skills at least at level C1 of the Common European Framework of Reference for Languages, or
b) English language skills at least at level B1 of the Common European Framework of Reference for Languages and German language skills at least corresponding to the language examination level of "DSH-2".

(6) In addition to the general admission requirements for the degree program, participation in individual modules or parts of modules may be made dependent on the fulfillment of specific module admission requirements.

In this case, the prerequisites are listed in the module list (Appendix 2) under “Prerequisites for Participation”. Sufficient knowledge of English (at least level C1 per the Common European Framework of Reference for Languages or CEFR) is necessary, especially to attend modules that can be taken in the field of economics and are imported from the master's program Economics and Institutions/Macroeconomics in accordance with Appendix 3, in order to be able to compile the necessary specialized literature.

§5 Academic advising

General academic advising is provided by the Central Academic Advising Service (Zentrale Allgemeine Studienberatung, ZAS) at Philipps-Universität Marburg. Subject-specific academic advising is usually provided by the professors or by authorized persons.

§6 Degree programs: structure, contents, curriculum and information

(1) The master's program in “Business Mathematics” is divided into the study areas Compulsory Elective Modules in Mathematics, Business and Economics Focus Area: Accounting and Finance, Business and Economics Focus Area: Market-Oriented Management, Business and Economics Focus Area: Information and Innovation Management, Business and Economics Focus Area: Economics, Free Compulsory Elective Modules, and Final Module.

(2) The degree program consists of modules that are assigned to the various study areas according to Para. 1. The program structure is as follows based on module assignments, the degree to which they are required, and the student’s calculated workload in credits (Leistungspunkte, LP):

	Compulsory course (Pflicht, PF) / Compulsory elective course (Wahlpflicht, WP)	Credits (Leistung-spunkte, LP)	Comment
Compulsory Elective Modules in Mathematics		***27-30***	
Empirical processes	WP	6	
High-Dimensional Statistics and Machine Learning	WP	6	
Large Specialization Module Stochastics	WP	9	
Mathematical and Nonparametric Statistics	WP	9	
Non-Life Insurance Mathematics	WP	3	
Optimization II	WP	6	
Probabilistic Combinatorics	WP	9	
Probability Theory	WP	9	
Quantitative Risk Management	WP	6	
Small Specialization Module Stochastics	WP	6	
Small Specialization Module Stochastics without Tutorial	WP	3	
Special Topics in Insurance Mathematics	WP	3	
Stochastic Processes	WP	6	
Stochastical Analysis	WP	9	
Import modules with content or methodological reference to the subject area of mathematics.***	WP	0-30	

Business and Economics Focus Area: Accounting and Finance		***0 or 24***	one of the four business-related focus areas must be selected
*Import modules from the Accounting and Finance concentration from the M.Sc. Business Administration**	WP	24	
Business and Economics Focus Area: Market-Oriented Management		***0 or 24***	
*Import modules from the Market-Oriented Management concentration from the M.Sc. Business Administration**	WP	24	
Business and Economics Focus Area: Technology and Innovation Management		***0 or 24***	
*Import modules from the Information and Innovation Management concentration from the M.Sc. Business Administration**	WP	24	
Business and Economics Focus Area: Economics		***0 or 24***	
*Import modules from the M.Sc. Economics and Institutions/Macroeconomics**	WP	24	
Free Compulsory Elective Modules		***36-39***	
Selected Advanced Topics in Business Mathematics A (Seminar)	WP	3	1 to 3****
Selected Advanced Topics in Business Mathematics B (Seminar)	WP	3	
*Seminar module from the M.Sc. Business Administration**	WP	6	
*Seminar module from the M.Sc. Economics and Institutions**	WP	6	
Advanced Software Project in Business Mathematics	WP	6	0 to 1*****
Industrial Internship	WP	6	
Practical course in stochastics*	WP	6	
Empirical processes	WP	6	
High-Dimensional Statistics and Machine Learning	WP	6	
Large Specialization Module Stochastics	WP	9	
Mathematical and Nonparametric Statistics	WP	9	
Non-Life Insurance Mathematics	WP	3	
Optimization II	WP	6	
Probabilistic Combinatorics	WP	9	
Probability Theory	WP	9	
Quantitative Risk Management	WP	6	
Small Specialization Module Stochastics	WP	6	
Small Specialization Module Stochastics without Tutorial	WP	3	
Special Topics in Insurance Mathematics	WP	3	
Stochastic Processes	WP	6	
Stochastical Analysis	WP	9	
*Import modules with substantive or methodological reference to the subject area of business mathematics**, ***	WP	0–36	
Final Module		***30***	
Master's Thesis	PF	30	
Total		***120***	

* Import modules according to Appendix 3 Import module list.

** No more than one advanced module may be taken in the area Compulsory Elective Modules in Mathematics. Modules amounting to 27 credits or 30 credits are to be included, so that together with the Free Compulsory Elective Modules area 66 credits are acquired. In the specialization modules, at least 9 credits each are recommended in the area of stochastics and in the area of optimization. In addition, the module Financial Mathematics I should be taken if this was not already been completed in the bachelor's degree program.
*** All selected economics modules except one must be from the selected concentration (Focus Area). A maximum of two modules can be chosen from the field of computer science. No more than two advanced modules from bachelor's degree programs may be taken.
**** If two mathematical seminars are taken, they must be taken in two different mathematical areas.
***** If an industrial internship has not yet been completed in the bachelor's degree, the internship should be performed as an external internship module (Industrial Internship); otherwise it is also possible to take this as an internal internship.

(3) In the degree program area Compulsory Elective Modules in Mathematics, students deepen and broaden their knowledge and competences in different disciplines of mathematics. This broadens their mathematical spectrum and introduces them to modern mathematical application methods.

(4) The study areas Business and Economics Focus Area are to be chosen in the form of one of the four focus areas “Accounting and Finance”, “Market-Oriented Management”, “Information and Innovation Management”, or “Economics”. The selected focus is shown on the certificate in accordance with §33(1). The Accounting and Finance concentration provides students with in-depth application skills and the ability to further develop approaches to internal and external accounting as well as decision and investment theory. The Market-Oriented Management concentration provides students with in-depth application skills as well as the ability to further develop solutions in the area of a market-oriented perspective on business. The Information and Innovation Management concentration provides students with in-depth application skills as well as the ability to further develop approaches to solutions in the area of resource-based perspectives on business. Upon completion of the Economics concentration, students will have gained an introductory understanding of central core areas of economics and will be able to apply this knowledge to the analysis of economic theory and policy problems. One substantive focus is on the analysis of economic institutions, i.e., the formal and informal rules that influence economic behavior.

(5) In the Free Compulsory Elective Modules area of study, modules from mathematics and economics can be taken largely at will according to individual preferences. Through this, students deepen and broaden their competencies and knowledge from the bachelor's program and thus acquire the necessary prerequisites for writing the master's thesis. In one to three seminars, students deepen their ability to communicate mathematical or economic statements and practice analyzing and describing essential content from scientific texts. Furthermore, an internship is to be completed in this area; in the external internship module (Industrial Internship), the application of competencies acquired in the course of study in the professional field of a business mathematician is learned, while the internal internships (Advanced Software Project in Business Mathematics or Internship on Stochastics modules) are concerned with acquiring competencies in the algorithmic implementation of complex mathematical content in software.

(6) The exemplary sequence of the modularized studies is shown in the degree program plan (cf. Appendix 1).

(7) General information and regulations in their current form are available on the course-related website at

https://www.uni-marburg.de/de/fb12/studium/studiengaenge/m-sc-wirtschaftsmathematik

In particular, the module handbook and the degree program curriculum can be viewed there. Furthermore, a list of the current import and export opportunities for the degree program is published there.

(8) The assignment of the individual courses to the modules of the degree program can be seen in the course catalog of Philipps-Universität Marburg, which is made available on the homepage of the university.

§7 General standard program duration and start of studies

(1) The general standard period of study for the master's degree program in "Business Mathematics" is 4 semesters. On the basis of these Degree Program and Examination Regulations, the department will ensure a range of courses enabling students to complete all of the work required to pass the degree program, including preparing the master's thesis, within the general standard program duration.

(2) The degree program can be started in either winter or summer semester.

§8 Study abroad

(1) The International Student Advisory Service of the respective department as well as the offices and academic units at Philipps-Universität Marburg responsible for study abroad programs will advise students on various destination universities as well as on internship opportunities abroad, technical requirements, options for getting study abroad work recognized as well as funding opportunities.

(2) Students will conclude a learning agreement with their department and the foreign host university prior to their stay abroad. The degree program to be completed abroad as well as the credits to be earned upon successful completion of a module or course must be specified in this kind of learning agreement. The students will agree to complete the agreed degree program at the host university as an integral part of their studies and the department will recognize the credits earned. The learning agreement is binding on the parties involved. To conclude a learning agreement, it is essential that the targeted learning outcomes and skills largely coincide. It is not necessary that the content be the same.

(3) In justified exceptional cases, the learning agreement can be modified or adapted before and during the stay abroad at the request of the student with the consent of the department. The consent of the foreign host university is also required.

(4) Departures from the commitments made in the learning agreement will be permitted after the fact only if they are not the student's fault and appropriate documentation is provided.

§9 Structural variant of the degree program

The master's program in "Business Mathematics" corresponds to the structural variant of a "single-subject program".

§10 Modules and credits

The rules under §10 of the General Regulations apply.

§11 Practical modules and profile modules

(1) The master's program in "Business Mathematics" includes an internal practical module in the degree program area Free Compulsory Elective Modules in accordance with §6 of these Degree Program and Examination Regulations.

(2) The master's program in "Business Mathematics" includes an external practical module in the degree program area Free Compulsory Elective Modules in accordance with §6 of these Degree Program and Examination Regulations.
If the student has been unable to find an internship position despite efforts, the department may arrange a suitable external internship position within a reasonable time frame. If this effort fails, an external internship may be substituted instead by the other modules provided for in §6 of these Degree Program and Examination Regulations for the corresponding area.

(3) Otherwise, the provisions of §11 of the General Regulations apply.

§12 Module and course registration and module and course deregistration

(1) Binding registration is required for modules or courses in individual cases, insofar as this is specified in the module handbook.

(2) replace with: The registration and deregistration procedure as well as the registration and deregistration deadlines will be announced in a timely fashion on the degree program-related website in accordance with §6(7). In the event of limited capacity, module or course placements are allocated in accordance with §13 of these Degree Program and Examination Regulations.

§13 Access to compulsory elective modules or courses with limited participation options

(1) Registration caps may be set for compulsory elective modules and courses by means of a departmental council resolution, provided that this is absolutely necessary for the implementation of orderly teaching and degree program operations and for the achievement of the educational objective. Whenever the number of participants is fixed, this will be announced in an appropriate manner and in a timely fashion before the start of the compulsory elective module or course.

(2) For a compulsory elective module or a course with limited capacity, there is no entitlement to participate provided that there is open capacity to take at least one other alternative compulsory elective module or course.

(3) If the number of registrations for a compulsory elective module or course exceeds the number of available places, a selection must be made.
The selection will be conducted by lot.
In all cases, it must be ensured that, within the framework of the available capacity, hardship cases are considered in advance, in particular those as defined by §26(1 and 2) (Priority Group 1) and students with a special interest in participation (Priority Group 2). A special interest exists in particular for students:

- for whom the required elective module or course is required due to an internal specialization,
- who did not receive a place in a previous semester despite having registered, even though the degree program curriculum provided for the compulsory elective module,

- who previously did not pass the compulsory elective module or course, if repeating the module or course is required to retake the examination.

If, in individual cases, the available places are not sufficient for consideration of the two priority groups, students from Priority Group 1 must have priority registration; within each group, the decision is then made by drawing lots.

§14 Application of modules across degree programs

(1) Modules are planned that are based on the provisions of other degree programs ("import modules") in terms of what they offer and their examination rules. More detailed information on these modules is summarized in Appendix 3.

(2) Modules offered in the master's program in business mathematics, which can also be completed in the context of other programs, are subject to the regulations of §20(4) of these Degree Program and Examination Regulations as well as §14(2) General Regulations.

§15 Academic grades

§15(1) of the General Regulations applies.

III. Examination-related provisions

§16 Examination committee

(1) The departmental council will appoint the examination committee.

(2) The members of the examination committee will consist of:

1. Four professors,
2. One research assistant, and
3. Two students.

One substitute member will be elected for each member.
Of the members in accordance with item 1, three should come from the field of mathematics and one from the field of computer science.

(3) The term of office, the chairship, quorum and other issues are governed by §16 of the General Regulations.

§17 Duties of the examination committee and examination administration

The rules under §17 of the General Regulations apply.

§18 Examiners and observers

The rules under §18 of the General Regulations apply.

§19 Recognition of academic grades and examination results

The rules under §19 of the General Regulations apply.

§20 Module list, import and export module list and module manual

(1) The modules to be completed as part of the degree program are summarized in the module list (Appendix 2) as well as in the list of import modules (Appendix 3). These lists as well as §6 provide the type of modules, their allocation to the various areas of the degree program, choices among modules and within modules, the prerequisites for participation in the modules as well as the credits to be earned, the form of examination,

assessment and the expertise objectives. In the case of import modules, the original module lists of the offering degree program provide this information.

(2) The offer of import modules is subject to the provision that changes to the modules can be made by the offering academic units (e.g. in particular using accreditations). This does not require an amendment to these Degree Program and Examination Regulations. Such changes will be announced by the examination committee in a timely fashion on the program website. In addition, the examination committee may decide that in general or in individual cases upon a justified petition, additional modules may be allowed as import modules, provided that the offering department or institution agrees to this.

(3) Further information with detailed module descriptions as well as the current range of import modules will be published in a module handbook on the program website.

(4) The export modules are summarized in Appendix 4.

§21 Examinations

The rules under §21 of the General Regulations apply.

§22 Examination types and durations; test-taking times; scopes

(1) Written examinations will take the form of:

- Written examinations (*Klausuren*), which may also be administered in whole or in part as e-examinations (in accordance with Appendix 6 of the General Regulations) and in whole or in part as multiple-choice examinations (in accordance with Appendix 8 of the General Regulations),
- Internship reports
- Written analyses (*schriftliche Ausarbeitungen*), or
- The master's thesis.

(2) Oral examinations will take the form of:

- Individual tests, or
- The oral defense of the master's thesis.

(3) Additional examination forms include:

- Presentations
- Seminar presentations

(4) The following durations or test-taking times and scopes are assigned to the examination forms mentioned above. In the case of written examinations that are not conducted under supervision, the total time available to take the tests should be longer. The examination duration is 60-120 minutes for written examinations and 20-30 minutes for individual oral examinations. Written papers and the internship report usually include the following: 10-20 pages long and take about two weeks to complete; the presentation and the seminar presentations take place as part of a module event (max. 90 minutes). The scope or length of the master's thesis is usually 30-90 pages. The oral defense lasts a maximum of 60 minutes.

(5) The corresponding regulations of the Degree Program and Examination Regulations for the degree programs from which the modules are imported, as

amended, will apply to the import modules in accordance with Appendix 3 or the examinations provided for in that appendix.

(6) Multimedia-based written examinations (“e-examinations”) will be administered in accordance with the provisions under General Regulations, Appendix 6.

(7) Multiple-choice examinations will take place in accordance with the provisions in the General Regulations (“answer-choice examinations”), Appendix 8.

(8) Otherwise, the provisions of §22 General Regulations apply.

§23 Master’s thesis

(1) The master’s thesis (graduation paper) is a mandatory component of the degree program. It constitutes a final joint module together with an oral defense. The master’s thesis must be written in German or English.

(2) The master’s thesis is an examination paper by which the candidate must demonstrate the ability to work independently on a delimited problem in the subject area of business mathematics using scientific methods within a specified period of time. It aims at the candidate applying the knowledge acquired in the course of study to relevant economics questions, for the solution of which advanced mathematical methods and processes are used to a particular extent. It further aims to present the results in written form in a scientific/scholarly manner and to appropriately present and defend them publicly. The scope of the master’s thesis is 27 credits. The final module includes an additional 3 credits for the oral defense.

(3) The master’s thesis must be written as an individual work.

(4) Permission to start the master’s thesis requires that 12 credits (LP) have been earned in the chosen major in the field of economics and that a seminar module has been completed at the same department as the master's thesis. A total of at least 66 credits (LP) must have been earned in the modules for the master’s degree program.

(5) The candidate will propose an adviser and a reviewer authorized as examiner as the first reviewer for the master’s thesis. The candidate also has the right to propose the second reviewer. The adviser and the first reviewer may be the same person. These proposals do not establish an entitlement. The first reviewer must be appointed by the examination committee for the examination of master’s theses. The topic of the master’s thesis is submitted to the examination committee by the first reviewer and assigned by the examination committee. If the candidate does not find an adviser and a first reviewer, the chair of the examination committee will appoint the adviser and the first reviewer and ensure that a topic for the master’s thesis is issued in a timely fashion.

(6) The master’s thesis must be completed within a thesis-writing period of 6 months. The topic of the thesis must be such that it can be written within this period. An extension of the thesis-writing time up to a maximum of 20% (e.g. due to unforeseen problems in obtaining literature or data) is possible upon justified petition by the candidate; this does not lead to the award of additional credits. The thesis-writing time begins upon issuances of the topic; the issue date must be recorded. The topic should be issued in a timely manner such that, even if an extension of the thesis-writing time is granted, there is no extension of the program duration.

(7) The master's thesis must be submitted in a timely fashion to the examination committee or to an office designated by it in 3 printed copies as well as in digital form in accordance with the specifications of the examination committee. The time of submission must be recorded in the records. When submitting the thesis, the candidate must give written assurance that he or she wrote the thesis independently and did not use any sources or aids other than those indicated. If the master's thesis is not submitted on time, it will be graded as "insufficient" (0 points) in accordance with §28(2) of the General Regulations.

(8) The master's thesis has not been passed if the overall grade does not receive at least 5 points (grade of "sufficient") in accordance with §28(2) of the General Regulations; it may be repeated once. The oral defense as part of the final module can also be repeated once. The examination committee will ensure that the candidate receives a new topic within six weeks of notification of the failure. A return of the topic within the period specified in §23(7)(1) of the General Regulations is permitted only if the candidate did not make use of this option when writing the master's thesis for the first time. A second repetition of the master's thesis is excluded.

(9) Grade compensation for a failed master's thesis is not permitted. Grade compensation for a failed oral defense within the scope of the final module is also excluded.

(10) Otherwise, the provisions of §23 of the General Regulations apply.

§24 Examination dates, examination registration and examination deregistration

(1) The examination committee will announce the periods of examinations and repeat examinations. Dates for written examinations (*Klausuren)* and other examination dates that are equally valid for all participants of a module are announced in the course catalog. Examination dates to be agreed upon individually (such as presentations) will be listed in the course catalog with the note "n. V." (by arrangement).

(2) Examinations will be administered within the framework of the respective module courses or immediately thereafter. If examinations are administered after module courses, they should generally be offered in a two- to three-week examination period at the end of the lecture period or at the beginning or end of the subsequent lecture-free period. As a rule, examinations should be administered on the same day of the week and at the same time as the corresponding module course. The examiner should also provide for the preparation of examinations, such as term papers, during the lecture-free period.

(3) For the repetition of examinations, the first repetition date will be set in such a way that, in the case of successful participation, continued study in the following semester is guaranteed.

(4) Binding registration is required for participation in an examination. The examination committee will announce the deadlines and the form of registration in an appropriate manner no later than 4 weeks before the start of the registration period. Permission to take the examination will be denied if the registration deadline is not met or if examination permission requirements are not met.

(5) When registering for examinations, students can autonomously choose between the first date and the repeat date. When choosing the date for the repeat examination, no further repeat examination will be offered in the same semester in case of failure. In this case, if subsequent modules build on each other (consecutive modules) and require the failed module, continuous study in deviation from §24(3) cannot be guaranteed the following semester.

(6) A binding examination registration may be withdrawn without stating reasons provided that this is done before the deadline set for this by the examination committee. These deadlines as well as the format for the withdrawal will be announced together with the corresponding regulations for registration.

(7) Upon application with justification to the examination committee, alternative dates will be set for examinations that cannot be taken due to limitations on work for religious reasons. Proof of membership in the appropriate religious community must be submitted with the application. The application must be submitted no later than four weeks before the examination date.

§25 Time requirements to earn credits

The rules under §25 of the General Regulations apply.

§26 Family support, accommodations for hardships and informal part-time study

(1) In courses and examinations, consideration must be given to the stress caused by pregnancy and raising children, by caring for relatives in need, and by a student's disability or chronic illness. The type and severity of the hardship must be proved by the student in a timely fashion to the person responsible for the course or to the office of the examination committee (Examination Office) with suitable documentation. In cases of doubt, the examination committee will decide upon written petition. In cases of illness, the examination committee may require a medical certificate from a public health officer. It must be made possible for students to utilize statutory maternity protection periods and parental leave.

(2) If a student can credibly demonstrate that he or she is unable to take the examination in whole or in part in the scheduled form due to a disability, a chronic illness, the care of dependents in need, pregnancy, or the raising of children, the examination committee will provide accommodations for these by taking appropriate measures, such as an extension of the test-taking time or a different arrangement of the examination procedure.

(3) In accordance with the applicable legal regulations, the degree program may, upon petition, be conducted in whole or in part as an informal part-time program. In the case of an approved informal part-time study, there is no entitlement to the provision of special teaching and study opportunities. In all cases, academic advising is strongly recommended before initiating informal part-time study.

§27 Absence, withdrawal, fraud, violation of regulations

(1) Coursework will be deemed failed, or an examination will be graded as "insufficient" (0 points) in accordance with §28(2) of the General Regulations if the candidate misses an examination date that is binding on him or her without good reason or if he or she withdraws without good reason from a course or examination which he or she has

already started. The same applies if a course or examination is not completed within the specified completion time.

(2) Notice of the cause asserted for the failure or withdrawal must be given in writing without delay and must be credible. In the case of illness, a medical certificate must be submitted. The examination results already available will be recognized in this case.

(3) If a candidate attempts to influence the result of a course or examination by deception or the use of unauthorized aids, the course or examination in question will be deemed failed (0 points) in accordance with §28(2) of the General Regulations. A candidate who disrupts the proper performance of a type of coursework or an examination may be excluded from continuing the performance of the type of coursework or examination by the respective examiner or supervisor; in this case, the respective coursework will also be deemed failed, or the examination will be graded as "insufficient" (0 points) in accordance with §28(2) of the General Regulations. In serious cases, the examination committee can exclude the candidate from taking further examinations such that the examination entitlement in the degree program expires.

(4) Decisions in accordance with paragraphs 1 to 3 must be communicated to the candidate in writing without delay, they must be substantiated, and they must be accompanied by instructions on how to appeal.

§28 Grading and grade composition

(1) The modules Industrial Internship, Advanced Software Project in Business Mathematics, Selected Advanced Topics in Business Mathematics A (Seminar) and Selected Advanced Topics in Business Mathematics B (Seminar) are not assessed with points, in deviation from §28(2) General Regulations.

(2) The overall grade for the master's examination in points in accordance with Column (a) in the table in §28(6) of the General Regulations is calculated from the mean value of the module evaluations weighted by credits (LP). Modules not graded with points (ungraded) are not taken into account.

(3) Otherwise, the provisions of §28 of General Regulations apply.

§29 Nonbinding examination option

There is no provision for a nonbinding examination option.

§30 Repeating examinations

(1) Passed examinations cannot be repeated.

(2) Failed examinations may be retaken three times.

(3) The one-time change of up to two definitively failed compulsory elective modules is permitted.

(4) §23(12) (1 & 2) General Regulations (Master's Thesis and Oral defense) and §21(3) (4) General Regulations (Compensated Partial Module Examinations) remain unaffected

§31 Loss of the right to take the examination and final failure

(1) The right to take examinations in the degree program for which the student is enrolled is definitively lost in particular if

1. An examination has not been passed after exhausting all attempts to repeat it unless it is an examination in a module pursuant to §30(3);
2. There has been a serious case of fraud pursuant to §27(3)(3).

(2) A notice of final failure and the associated loss of the right to retake the examination will be issued, which will be accompanied with instructions on how to appeal.

§32 Invalidity of examination results

The rules under §32 of the General Regulations apply.

§33 Certificate

(1) The master's degree certificate will indicate, if applicable, the major fields of study per §6.
(2) In all other respects, the provisions of §33 General Regulations will apply.

§34 Diploma

The rules under §34 of the General Regulations apply.

§35 Diploma supplement

The rules under §35 of the General Regulations apply.

§ 36 Transcript of records and complete grade record

The rules under §36 of the General Regulations apply.

IV. Final provisions

§37 Inspection of examination documents

The rules under §37 of the General Regulations apply.

§38 Effective date and transitional provisions

(1) These regulations come into force on the day after their publication in the Official Bulletin of Philipps-Universität Marburg. At the same time, the examination regulations will expire for the degree program in Business Mathematics with the degree of Master of Science (M.Sc.) of 28 October 2015 (published in the Official Bulletin of Philipps-Universität Marburg No. 6/2016), including the version of the first amendment dated 1 June 2016 (published in the Official Bulletin of Philipps-Universität Marburg No. 56/2016), and the version of the second amendment dated 25 October 2017 (published in the Official Bulletin of Philipps-Universität Marburg No. 80/2017).

(2) These Degree Program and Examination Regulations will apply to all students who start their studies as of winter semester 2023/2024.

(3) Students who began their studies before these Degree Program and Examination Regulations came into force may take the master’s examination in accordance with the examination regulations of 28 October 2015, including their amended versions of 1 June 2016 and 25 October 2017, until summer semester of 2027 at the latest. The examination committee may issue rules for this transition period that favor a voluntary

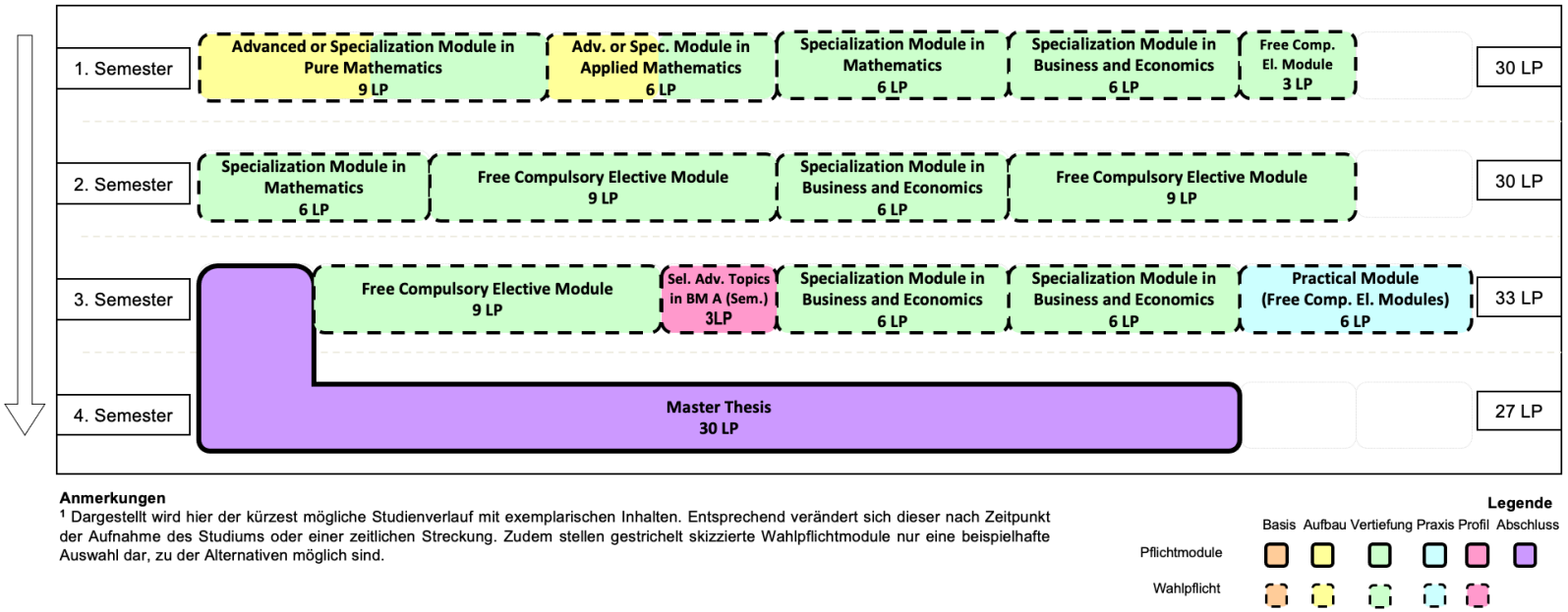
switch to these Degree Program and Examination Regulations. The switch to these Degree Program and Examination Regulations must be applied for in writing and is irrevocable.

Marburg, 18 April 2023
signed
Prof. Dr. Bernd Freisleben
Dean of the Department of
Mathematics and Computer Science
at Philipps-Universität Marburg

Appendix 1: Example curriculum

Business Mathematics (M.Sc.)[1]

Studienbeginn in einem Wintersemester oder einem Sommersemester



Anmerkungen

[1] Dargestellt wird hier der kürzest mögliche Studienverlauf mit exemplarischen Inhalten. Entsprechend verändert sich dieser nach Zeitpunkt der Aufnahme des Studiums oder einer zeitlichen Streckung. Zudem stellen gestrichelt skizzierte Wahlpflichtmodule nur eine beispielhafte Auswahl dar, zu der Alternativen möglich sind.

Anlage 1: ExemplarischerStudienverlaufsplan	**Appendix 1: Example Curriculum**
***Business Mathematics (M.Sc.)*[1]**	***Business Mathematics (M.Sc.)*[1]**
Studienbeginn in einem Wintersemester oder einem Sommersemester	Start of program in winter or summer semester
1. Semester	1. Semester
Advanced or Specialization Module In Pure Mathematics 9 LP	**Advanced or Specialization Module In Pure Mathematics 9 LP**
Adv. or Spec. Module In Applied Mathematics 6 LP	**Adv. or Spec. Module in Applied Mathematics 6 LP**
Specialization Module in Mathematics 6 LP	**Specialization Module in Mathematics 6 LP**
Specialization Module in Business and Economics 6 LP	**Specialization Module in Business and Economics 6 CR**
Free Comp. El. Module 3 LP	**Free Comp. El. Module 3 CR**
30 LP	30 LP
2. Semester	2. Semester
Specialization Module in Mathematics 6 LP	**Specialization Module in Mathematics 6 LP**
Free Compulsory Elective Module 9 LP	**Free Compulsory Elective Module 9 CR**
Specialization Module in Business and Economics 6 LP	**Specialization Module in Business and Economics 6 CR**
Free Compulsory Elective Module 9 LP	**Free Compulsory Elective Module 9 CR**
30 LP	30 LP
3. Semester	3. Semester
Free Compulsory Elective Module 9 LP	**Free Compulsory Elective Module 9 CR**
Sel. Adv. Topics in BM A (Sem.) 3 LP	**Sel. Adv. Topics in BM A (Sem.) 3 LP**
Speciallzation Module in Business and Economics 6 LP	**Specialization Module in Business and Economics 6 CR**
Speciallzation Module in Business and Economics 6 LP	**Specialization Module in Business and Economics 6 CR**
Practical Module (Free Comp. El. Modules) 6 LP	**Practical Module (Free Comp. El. Modules) 6 CR**
33 LP	33 LP
4. Semester	4. Semester
Master Thesis 30 LP	**Master's Thesis 30 LP**
27 LP	27 LP
Anmerkungen	**Footnotes**
[1] Dargestellt wird hier der kürzest mögliche Studienverlauf mit exemplarischen Inhalten. Entsprechend verändert sich dieser nach Zeitpunkt der Aufnahme des Studiums oder einer zeitlichen Streckung. Zudem stellen gestrichelt skizzierte Wahlpflichtmodule nur eine beispielhafte Auswahl dar, zu der Alternativen möglich sind.	[1] The shortest possible degree program curriculum with content examples is presented here. Accordingly, this changes after the date that the program is started or an extension. In addition, elective modules outlined in dashed lines represent only an example selection for which alternatives are possible.

Legende	**Legend**
Pflichtmodule	Compulsory module
Wahlpflicht	Compulsory Elective
Basis	Basic
Aufbau	Advanced
Vertiefung	Specialization
Praxis	Practice
Profil	Profile
Abschluss	Degree

Appendix 2: List of modules

Name of module *German translation*	**LP**	**Degree of obligation**	**Level**	**Qualification goals**	**Prerequisites**	**Prerequisites to earn credits (LP)**
Compulsory Elective Modules in Mathematics						
Advanced Software Project in Business Mathematics *Fortgeschrittenes Wirtschaftsmathematisches Praktikum*	6	Compulsory elective module	Practice module	Students: - can implement mathematical algorithms in small working groups under guidance, but largely independently, - can model mathematical objects in suitable data structures, - can acquire the necessary, more detailed knowledge of the procedures used and the development environment. - possess in-depth competencies in the implementation of mathematical procedures in software, the organization of a software project and teamwork.	None. Recommended are the competencies taught in the basic modules, in the Object-Oriented Programming or Declarative Programming module, as well as in the relevant specialization module.	Credit requirement(s): Creating a piece of software Testing: Presentation ***Ungraded module***
Compulsory Elective Modules in Mathematics and Free Compulsory Elective Modules						
Empirical Processes *Empirische Prozesse*	6	Compulsory elective module	Advanced module	Students: - possess basic knowledge of the theory of empirical processes and the convergence of stochastic processes, - master applications to statistical problems, - were introduced to a current scientific field, - have deepened mathematical ways of working (developing mathematical intuition and its formal justification, abstraction, proof), - have practiced oral communication skills in exercise sections by practicing free speech in front of an audience and in discussion.	None. The competencies taught in the basic modules as well as in the specialization module on Probability Theory are recommended.	Credit requirement(s): Earn at least 50% of the points from the weekly practice assignments. Testing: Oral examination (individual examination) or in-class written examination (*Klausur*)
High-Dimensional Statistics and Machine Learning *Hochdimensionale Statistik und maschinelles Lernen*	6	Compulsory elective module	Advanced module	Students: - possess theoretical knowledge of the current research areas of high-dimensional statistics and machine learning, - know important algorithms and how they work in the R programming language, - have deepened mathematical ways of working (developing mathematical intuition and its formal justification, abstraction, proof), - have practiced oral communication skills in exercise sections by practicing free speech in front of an audience and in discussion.	None. The competencies taught in the Stochastics internship and the Specialization Module in Statistics are recommended.	Credit requirement(s): Earn at least 50% of the points from the weekly practice assignments. Testing: In-class written examination (*Klausur*) or oral examination (individual examination)

Name of module *German translation*	**LP**	**Degree of obligation**	**Level**	**Qualification goals**	**Prerequisites**	**Prerequisites to earn credits (LP)**
Large Specialization Module Stochastics *Großes Vertiefungsmodul Stochastik*	9	Compulsory elective module	Advanced module	Students: - have been introduced to current research in stochastics, - have learned to use research literature in stochastics, - have gained insight into the emergence of new mathematical results, - have deepened their mathematical knowledge in a special area of stochastics, - can independently access current scientific articles from national and international journals, - have deepened mathematical ways of working (developing mathematical intuition and its formal justification, abstraction, proof), - have practiced oral communication skills in exercise sections by practicing free speech in front of an audience and in discussion.	None. The competencies taught in the advanced modules (depending on the topic) are recommended.	Credit requirement(s): Earn at least 50% of the points from the weekly practice assignments. Testing: In-class written examination (*Klausur*) or oral examination (individual examination)
Mathematical and Nonparametric Statistics *Mathematische und nichtparametrische Statistik*	9	Compulsory elective module	Advanced module	Students: - know the basic concepts of mathematical and nonparametric statistics, - are familiar with some important procedures in statistics and can apply them using the statistical software R, - have deepened mathematical ways of working (developing mathematical intuition and its formal justification, abstraction, proof), - have practiced oral communication skills in exercise sections by practicing free speech in front of an audience and in discussion.	None. The competencies taught in the basic modules, the specialization module in probability theory and the specialization module in statistics are recommended.	Credit requirement(s): Earn at least 50% of the points from the weekly practice assignments. Testing: In-class written examination (*Klausur*) or oral examination (individual examination)
Non-Life Insurance Mathematics *Schadenversicherungsmathematik*	3	Compulsory elective module	Advanced module	Students: - know the basic concepts and models of non-life actuarial science, - can evaluate the appropriateness of non-life actuarial models/methods.	None. The competencies taught in the basic modules Analysis and Linear Algebra and in the advanced module Elementary Stochastics are recommended.	Credit requirement(s): Earn at least 50% of the points from the weekly practice assignments. Testing: Oral examination (individual examination) or in-class written examination (*Klausur*)
Optimization II *Optimierung II*	6	Compulsory elective module	Advanced module	Students: - have been introduced to current research results in the field of optimization, - have learned to use research literature in the field of optimization,	None. The competencies taught in the basic modules as well as in the advanced	Credit requirement(s): Earn at least 50% of the points from the weekly practice assignments.

Name of module *German translation*	**LP**	**Degree of obligation**	**Level**	**Qualification goals**	**Prerequisites**	**Prerequisites to earn credits (LP)**
				- have gained insight into the emergence of new mathematical results, - have deepened their mathematical knowledge in the field of optimization, - can independently access current scientific articles from national and international journals, - have deepened mathematical ways of working (developing mathematical intuition and its formal justification, abstraction, proof), - have practiced oral communication skills in exercise sections by practicing free speech in front of an audience and in discussion.	module Continuous Optimization are recommended. Depending on the event, other competencies may be recommended.	Testing: In-class written examination (*Klausur*) or oral examination (individual examination)
Probabilistic Combinatorics *Probabilistische Kombinatorik*	9	Compulsory elective module	Advanced module	Students: - can derive basic properties of combinatorial structures using probabilistic methods, - can recognize combinatorial structures in different contexts and analyze them using probabilistic methods - have deepened mathematical ways of working (development of mathematical intuition and its formal justification, abstraction, proof), - have improved their oral communication skills in exercise sections through discussion and speaking in front of an audience.	None. The competencies taught in the Elementary Stochastics and Discrete Mathematics modules are recommended.	Credit requirement(s): Earn at least 50% of the points from the weekly practice assignments. Testing: In-class written examination (*Klausur*) or oral examination (individual examination)
Probability Theory *Wahrscheinlichkeitstheorie*	9	Compulsory elective module	Advanced module	Students: - understand the foundations of probability theory in a mathematically rigorous way, based on measure theory, - have deepened mathematical ways of working (developing mathematical intuition and its formal justification, abstraction, proof), - have practiced oral communication skills in exercise sections by practicing free speech in front of an audience and in discussion.	None. The competencies taught in the basic modules and in the advanced modules Measure and Integration Theory and Elementary Stochastics are recommended.	Credit requirement(s): Earn at least 50% of the points from the weekly practice assignments. Testing: In-class written examination (*Klausur*) or oral examination (individual examination)
Quantitative Risk Management *Quantitatives Risikomanagement*	6	Compulsory elective module	Advanced module	Students: - know basic concepts of quantitative risk management, especially for the financial industry, - understand methods for estimating market risk as well as credit risk, - can implement these with the statistical software R,	None. The competencies taught in the basic modules, in the specialization module Elementary Stochastics, in the specialization module Probability	Credit requirement(s): Earn at least 50% of the points from the weekly practice assignments. Testing:

Name of module *German translation*	**LP**	**Degree of obligation**	**Level**	**Qualification goals**	**Prerequisites**	**Prerequisites to earn credits (LP)**
				- have improved their oral communication skills in the exercises by practicing speaking in front of an audience and in discussion.	Theory and in the practical course on Stochastics are recommended.	In-class written examination (*Klausur*) or oral examination (individual examination)
Small Specialization Module Stochastics *Kleines Vertiefungsmodul Stochastik*	6	Compulsory elective module	Advanced module	Students: - have been introduced to current research in stochastics, - have learned to use research literature in stochastics, - have gained insight into the emergence of new mathematical results, - have deepened their mathematical knowledge in a specific area of stochastics, - can independently access current scientific articles from national and international journals, - have deepened mathematical ways of working (developing mathematical intuition and its formal justification, abstraction, proof), - have practiced oral communication skills in exercise sections by practicing free speech in front of an audience and in discussion.	None. The competencies taught in the advanced modules (depending on the topic) are recommended.	Credit requirement(s): Earn at least 50% of the points from the weekly practice assignments. Testing: In-class written examination (*Klausur*) or oral examination (individual examination)
Small Specialization Module Stochastics without Tutorial *Kleines Vertiefungsmodul Stochastik ohne Tutorium*	3	Compulsory elective module	Advanced module	Students: - have been introduced to current research in stochastics, - have learned how to use research literature, - have gained insight into the emergence of new mathematical results, - have deepened their mathematical knowledge in a specific area of stochastics.	None. The competencies taught in the advanced modules (depending on the topic) are recommended.	Testing: In-class written examination (*Klausur*) or oral examination (individual examination)
Special Topics in Insurance Mathematics *Spezialthemen der Versicherungsmathematik*	3	Compulsory elective module	Advanced module	Building on the modules Personal Insurance Mathematics and Non-Life Insurance Mathematics, students have become familiar with important special topics in actuarial mathematics.	The competencies taught in the basic modules Analysis and Linear Algebra and in the advanced module Elementary Stochastics are recommended. The lecture builds on the basic knowledge of the modules Personal Insurance Mathematics and Non-Life Insurance Mathematics.	Credit requirement(s): Earn at least 50% of the points from the weekly practice assignments. Testing: Oral examination (individual examination) or in-class written examination (*Klausur*)
Stochastic Processes *Stochastische Prozesse*	6	Compulsory elective module	Advanced module	Students: - know basics of the theory of stochastic processes in continuous time,	None. The competencies taught in the basic modules as	Credit requirement(s): Earn at least 50% of the points from the

Name of module *German translation*	**LP**	**Degree of obligation**	**Level**	**Qualification goals**	**Prerequisites**	**Prerequisites to earn credits (LP)**
				- master techniques of constructing and analyzing stochastic processes, - have been introduced to a current scientific field, - have deepened mathematical ways of working (developing mathematical intuition and its formal justification, abstraction, proof), - have practiced oral communication skills in exercise sections by practicing free speech in front of an audience and in discussion.	well as in the specialization module on Probability Theory are recommended.	weekly practice assignments. Testing: In-class written examination (*Klausur*) or oral examination (individual examination)
Stochastical Analysis *Stochastische Analysis*	9	Compulsory elective module	Advanced module	Students: - have gained insight into the research area of stochastic analysis, - know basic structures and techniques of stochastic analysis, - know selected applications of stochastic analysis, - have deepened mathematical ways of working (developing mathematical intuition and its formal justification, abstraction, proof), - have practiced oral communication skills in exercise sections by practicing free speech in front of an audience and in discussion.	None. The competencies taught in the basic modules and in the specialization module on Probability Theory are recommended.	Credit requirement(s): Earn at least 50% of the points from the weekly practice assignments. Testing: In-class written examination (*Klausur*) or oral examination (individual examination)
Free Compulsory Elective Modules						
Industrial Internship *Industriepraktikum*	6	Compulsory elective module	Practice module	Students: - can apply typical course content to solve problems encountered in business or technical practice, - have improved their teamwork skills through the necessary integration into external work groups of a company, - can prove themselves in an environment outside the university, - have developed their own initiative in searching for internship positions and researching the companies or institutions offering them, as well as in selecting a supervising university professor.	None.	Testing: Internship Report ***Ungraded module***
Selected Advanced Topics in Business Mathematics A ("Seminar") *Ausgewählte fortgeschrittene Themen der Wirtschaftsmathematik A („Seminar")*	3	Compulsory elective module	Profile module	Students: - can work out a special mathematical topic of business mathematics independently, - have developed their ability to work independently in a scientific manner, - have learned to prepare and break down mathematical relationships and to supplement them with explanatory content, - have learned how to use and search for scientific literature, - give a structured presentation tailored to the competencies of the audience,	None.	Two subtests: Seminar presentation Written analysis (*schriftliche Ausarbeitung*) ***Ungraded module***

Name of module *German translation*	**LP**	**Degree of obligation**	**Level**	**Qualification goals**	**Prerequisites**	**Prerequisites to earn credits (LP)**
				- have deepened their ability to use presentation media, - have expanded their ability to have structured discussions about mathematical contents in groups, - have learned how to use mathematical text typesetting programs during seminar preparation.		
Selected Advanced Topics in Business Mathematics B ("Seminar") *Ausgewählte fortgeschrittene Themen der Wirtschaftsmathematik B („Seminar")*	3	Compulsory elective module	Profile module	Students: - have worked out a special mathematical topic independently, - have developed their ability to work independently in a scientific manner, - have learned to prepare and break down mathematical relationships and to supplement them with explanatory content, - have learned how to use and search for scientific literature, - give a structured presentation tailored to the competencies of the audience, - have deepened their ability to use presentation media, - have expanded their ability to have structured discussions about mathematical contents in groups, - have learned how to use mathematical text typesetting programs during seminar preparation.	None.	Two subtests: Seminar presentation Written analysis (*schriftliche Ausarbeitung*) ***Ungraded module***
Final Module						
Master's Thesis *Masterarbeit*	30	Compulsory module	Final module	Students are able to:work on an extensive task from the field of business mathematics using scientific methods under guidance as well as to present a paper and the results contained therein appropriately in writing and orally.	Permission to start the master's thesis requires that 12 credit points (LP) have been completed in the chosen focus area in the field of economics and that a seminar module has been completed at the same department as the master's thesis. A total of at least 66 credits (LP) must have been earned in the modules for the master's degree program.	Two subtests: Master's thesis (weighting: 27 credits) and oral defense (weighting: 3 credits)

Name of module *Deutscher Modultitel*	**LP**	**Degree of obligation**	**Level**	**Qualification goals**	**Prerequisites**	**Prerequisites to earn credits (LP)**
Conditional Modules (*Auflagenmodule*) Note: These credits (LP) serve to fulfill conditional requirements only and do not count toward the 120 credits to be earned for the degree.						
Conditional Module 1 (small) *Kleines Auflagenmodul 1*	6	--- (*Auflagen-modul*)	--- (*Auflagen-modul*)	Within the framework of their bachelor's degree, students have already gained the ability to independently acquire knowledge and skills. As a part of this module, students should fill skills gaps that exist in a subject area that has been specified in more detail within the scope of a condition under §4(4) of these Degree Program and Examination Regulations. They will develop the skills by reading specialized literature and/or participating in (online) courses.	The prerequisite for this module is that it be specified as a requirement for admission to the program as part of a condition under §4(4).	Testing: Oral examination (individual examination) or in-class written examination (*Klausur*)
Conditional Module 2 (small) *Kleines Auflagenmodul 2*	6	--- (*Auflagen-modul*)	--- (*Auflagen-modul*)	Within the framework of their bachelor's degree, students have already gained the ability to independently acquire knowledge and skills. As a part of this module, students should fill skills gaps that exist in a subject area that has been specified in more detail within the scope of a condition under §4(4) of these Degree Program and Examination Regulations. They will develop the skills by reading specialized literature and/or participating in (online) courses.	The prerequisite for this module is that it be specified as a requirement for admission to the program as part of a condition under §4(4).	Testing: Oral examination (individual examination) or in-class written examination (*Klausur*)
Conditional Module 3 (small) *Kleines Auflagenmodul 3*	6	--- (*Auflagen-modul*)	--- (*Auflagen-modul*)	Within the framework of their bachelor's degree, students have already gained the ability to independently acquire knowledge and skills. As a part of this module, students should fill skills gaps that exist in a subject area that has been specified in more detail within the scope of a condition under §4(4) of these Degree Program and Examination Regulations. They will develop the skills by reading specialized literature and/or participating in (online) courses.	The prerequisite for this module is that it be specified as a requirement for admission to the program as part of a condition under §4(4).	Testing: Oral examination (individual examination) or in-class written examination (*Klausur*)
Conditional Module 4 (small) *Kleines Auflagenmodul 4*	6	--- (*Auflagen-modul*)	--- (*Auflagen-modul*)	Within the framework of their bachelor's degree, students have already gained the ability to independently acquire knowledge and skills. As a part of this module, students should fill skills gaps that exist in a subject area that has been specified in more detail within the scope of a condition under §4(4) of these Degree Program and Examination Regulations. They will develop the skills by reading specialized literature and/or participating in (online) courses.	The prerequisite for this module is that it be specified as a requirement for admission to the program as part of a condition under §4(4).	Testing: Oral examination (individual examination) or in-class written examination (*Klausur*)
Conditional Module 5 (small) *Kleines Auflagenmodul 5*	6	--- (*Auflagen-modul*)	--- (*Auflagen-modul*)	Within the framework of their bachelor's degree, students have already gained the ability to independently acquire knowledge and skills. As a part of this module, students should fill skills gaps that exist in a subject area that has been specified in more detail within the scope of a condition under §4(4) of these Degree Program and Examination Regulations. They will develop the skills by reading specialized literature and/or participating in (online) courses.	The prerequisite for this module is that it be specified as a requirement for admission to the program as part of a condition under §4(4).	Testing: Oral examination (individual examination) or in-class written examination (*Klausur*)

Name of module *Deutscher Modultitel*	**LP**	**Degree of obligation**	**Level**	**Qualification goals**	**Prerequisites**	**Prerequisites to earn credits (LP)**
Conditional Module 1 (large) *Großes Auflagenmodul 1*	9	--- (*Auflagen-modul*)	--- (*Auflagen-modul*)	Within the framework of their bachelor's degree, students have already gained the ability to independently acquire knowledge and skills. As a part of this module, students should fill skills gaps that exist in a subject area that has been specified in more detail within the scope of a condition under §4(4) of these Degree Program and Examination Regulations. They will develop the skills by reading specialized literature and/or participating in (online) courses.	The prerequisite for this module is that it be specified as a requirement for admission to the program as part of a condition under §4(4).	Testing: Oral examination (individual examination) or in-class written examination (*Klausur*)
Conditional Module 2 (large) *Großes Auflagenmodul 2*	9	--- (*Auflagen-modul*)	--- (*Auflagen-modul*)	Within the framework of their bachelor's degree, students have already gained the ability to independently acquire knowledge and skills. As a part of this module, students should fill skills gaps that exist in a subject area that has been specified in more detail within the scope of a condition under §4(4) of these Degree Program and Examination Regulations. They will develop the skills by reading specialized literature and/or participating in (online) courses.	The prerequisite for this module is that it be specified as a requirement for admission to the program as part of a condition under §4(4).	Testing: Oral examination (individual examination) or in-class written examination (*Klausur*)
Conditional Module 3 (large) *Großes Auflagenmodul 3*	9	--- (*Auflagen-modul*)	--- (*Auflagen-modul*)	Within the framework of their bachelor's degree, students have already gained the ability to independently acquire knowledge and skills. As a part of this module, students should fill skills gaps that exist in a subject area that has been specified in more detail within the scope of a condition under §4(4) of these Degree Program and Examination Regulations. They will develop the skills by reading specialized literature and/or participating in (online) courses.	The prerequisite for this module is that it be specified as a requirement for admission to the program as part of a condition under §4(4).	Testing: Oral examination (individual examination) or in-class written examination (*Klausur*)

Appendix 3: Import Module List

The degree programs listed below can be selected at the time of the adoption of these Degree Program and Examination Regulations. Pursuant to §14(1) of the General Regulations, the specifications of the Degree Program and Examination Regulations within the framework of which the modules are offered (in particular with regard to qualification objectives, prerequisites, credits (LP) and examination modalities) apply to these modules. Options for combining modules are set forth by the learning unit that offers them, as applicable.

The catalog of selectable degree programs can be changed or supplemented by the examination committee especially if the range of degree programs offered by the departments at Philipps-Universität Marburg changes. Such changes will be published by the examination committee on the respective program website. In individual cases or in general, the utilization of the following degree programs can be made dependent on the prior attendance of a degree program advising session or a binding registration. In case of enrollment caps, the corresponding regulations of the Degree Program and Examination Regulations apply. Otherwise, no guarantee is given that the courses listed below will actually be offered and can be taken.

Upon justified request by the student, it is permissible to approve additional import modules beyond the regular opportunities in individual cases; this requires that the offering department or institution also agree.

The current import opportunities are always published on the program website of the department offering the module as an export option.

Students should take note of the corresponding information and advising offerings in the department offering the module before starting coursework.

Any prerequisites or recommendations for participation as well as combination rules must be observed. If the department offering a module has specified combination rules and created export packages, depending on the scope of their own import window, only limited module course offerings will in fact be available.

At the time of the last resolution by the departmental council on the present Degree Program and Examination Regulations, an agreement existed on the following modules:

The following modules can be used for Compulsory Elective Modules in Mathematics The current import offer as well as possible allocation regulations and restrictions are presented on the website of the degree program (§6 (8)) or in the online module handbook linked there.			
Mathematics and Computer Science (Dept. 12), Degree program BSc Data Science	Continuous optimization	Advanced module	9
	Matrix Methods in Data Analysis	Advanced module	9
Mathematics and Computer Science (Dept. 12),	Algebraic geometry: Introduction	Advanced module	6

Degree program BSc Mathematics	Applied harmonic analysis I	Advanced module	6
	Discrete Geometry	Advanced module	6
	Elementary number theory	Advanced module	6
	Large Advanced Module Numerics/Optimization	Advanced module	9
	Group theory	Advanced module	6
	Small Advanced Module Numerics/Optimization	Advanced module	6
	Numerics (Basic Numerical Methods)	Advanced module	9
	Numerical analysis I	Advanced module	6
	Topological methods in data analysis	Advanced module	9
Mathematics and Computer Science (Dept. 12), Degree program MSc Mathematics	Algebras and their Representations	Specialization module	9
	Applied Harmonic Analysis II	Specialization module	6
	Approximation Theory	Specialization module	9
	Selected Topics in Numerical Analysis	Specialization module	6
	Fourier Integral Operators	Specialization module	9
	Functional Analysis	Specialization module	9
	Large Specialization Module Numerical Mathematics/Optimization	Specialization module	9
	Small Specialization Module Numerical Mathematics/Optimization	Specialization module	6
	Numerical Solution Methods for Finite Dimensional Problems	Specialization module	9
	Numerical Methods for Ordinary Differential Equations	Specialization module	6
	Numerical Solution Methods for Differential Equations	Specialization module	9
	Numerical Analysis II	Specialization module	6
	Partial Differential Equations	Specialization module	9
Mathematics and Computer Science (Dept. 12), Degree program BSc Business Mathematics	Large Advanced Module Stochastics	Advanced module	9
	Small Advanced Module Stochastics	Advanced module	6
	Optimization I	Advanced module	6
	Personal Insurance Mathematics	Advanced module	3
	Practical Course in Stochastics	Practical module	6
	Statistics	Advanced module	9

Subsequent modules usable for Business and Economics Focus Area: Accounting and Finance The current import offer as well as possible allocation regulations and restrictions are presented on the website of the degree program (§6 (8)) or in the online module handbook linked there.			
Economics (Dept. 02), Degree program MSc Business Administration	Advanced Management Accounting I: Value-based Management	Specialization module	6
	Advanced Management Accounting II: Managerial Decision Making, Governance, and Control	Specialization module	6
	Advanced Management Accounting III: Data Analysis and Empirical Research	Specialization module	6
	Asset Pricing Theory/Capital Market Theory	Specialization module	6
	Behavioral Finance	Specialization module	6
	Business Administration Abroad I (M.Sc.)	Specialization module	6
	Case Studies in Entrepreneurial Finance	Specialization module	6
	Accounting I: Concepts & International	Specialization module	6
	Accounting II: Valuation & Governance	Specialization module	6
	Accounting III: Selected Issues	Specialization module	6
	Accounting IV: In-depth questions	Specialization module	6
	Selected Problems in Banking and Finance/Banking	Specialization module	6
	Corporate Taxation I	Specialization module	6
	Corporate Taxation II	Specialization module	6
	Corporate Taxation III	Specialization module	6
	Business Valuation: Theory and Practice	Specialization module	6

Subsequent modules usable for Business and Economics Focus Area: Market-Oriented Management The current import offer as well as possible allocation regulations and restrictions are presented on the website of the degree program (§6 (8)) or in the online module handbook linked there.			
Economics (Dept. 02), Degree program MSc Business Administration	Business Administration Abroad I (M.Sc.)	Specialization module	6
	Culture, Leadership, and Knowledge Management	Specialization module	6
	International Marketing	Specialization module	6
	Management of Organizations	Specialization module	6
	Marketing Research in Theory and Practice	Specialization module	6
	Organizational Theories and Knowledge Management	Specialization module	6
	Strategic Management	Specialization module	6
	Vertical marketing in theory and practice	Specialization module	6

Subsequent modules usable for Business and Economics Focus Area: Technology and Innovation Management The current import offer as well as possible allocation regulations and restrictions are presented on the website of the degree program (§6 (8)) or in the online module handbook linked there.			
Economics (Dept. 02), Degree program MSc Business Administration	Business Administration Abroad I (M.Sc.)	Specialization module	6
	Digital Business	Specialization module	6
	Entrepreneurship and Small Business Management	Specialization module	6
	Development and marketing of new products and services	Specialization module	6
	Development and marketing of new products: Case studies	Specialization module	6
	Innovative Business Models	Specialization module	6
	Managing Digital Platform Ecosystems	Specialization module	6
	Strategic Management of Technology and Innovation: Case Studies	Specialization module	6
	Strategic Management of Technology and Innovation: Intellectual Property Management	Specialization module	6

Subsequent modules usable for Business and Economics Focus Area: Economics The current import offer as well as possible allocation regulations and restrictions are presented on the website of the degree program (§6 (8)) or in the online module handbook linked there.			
Economics (Dept. 02), Degree program MSc Economics and Institutions	Applied Institutional Economics	Advanced module	6
	Behavioral and Experimental Economics	Advanced module	6
	Development Economics	Advanced module	6
	Economic Policy	Specialization module	6
	Economics of Political Institutions	Advanced module	6
	Empirical Economics	Basic Module	6
	International Economic Policy	Specialization module	6
	International Institutional Economics	Advanced module	6
	Law and Economics	Advanced module	6
	Macroeconomics and Finance	Specialization module	6
	Monetary Economics	Specialization module	6
	Non-market institutions	Advanced module	6
	Political Economics	Specialization module	6
	Public Economics	Advanced module	6
	Theoretical Economics	Basic Module	6
	Theoretical Institutional Economics	Advanced module	6
	Topics in Institutional Economics Policy Abroad	Specialization module	6

	Topics in Money, Accounting and Finance Abroad	Specialization module	6

The following modules can be used for Free Compulsory Elective Modules The current import offer as well as possible allocation regulations and restrictions are presented on the website of the degree program (§6 (8)) or in the online module handbook linked there. Modules from computer science are marked with “Inf”, modules from an economics focus are marked with “AF” (Accounting and Finance), “II” (Information and Innovation Management), “MU” (Market-Oriented Management) or “VWL” (Economics).			
Economics (Dept. 02), Degree program MSc Business Administration	Advanced Management Accounting I: Value-based Management	Specialization module	AF 6
	Advanced Management Accounting II: Managerial Decision Making, Governance, and Control	Specialization module	AF 6
	Advanced Management Accounting III: Data Analysis and Empirical Research	Specialization module	AF 6
	Asset Pricing Theory/Capital Market Theory	Specialization module	AF 6
	Behavioral Finance	Specialization module	AF 6
	Business Administration Abroad I (M.Sc.)	Specialization module	6
	Case Studies in Entrepreneurial Finance	Specialization module	AF 6
	Culture, Leadership, and Knowledge Management	Specialization module	MU 6
	Digital Business	Specialization module	II 6
	Entrepreneurship and Small Business Management	Specialization module	II 6
	Development and marketing of new products and services	Specialization module	II 6
	Development and marketing of new products: Case studies	Specialization module	II 6
	Innovative Business Models	Specialization module	II 6
	International Marketing	Specialization module	MU 6
	Management of Organizations	Specialization module	MU 6
	Managing Digital Platform Ecosystems	Specialization module	II 6
	Marketing Research in Theory and Practice	Specialization module	MU 6
	Organizational Theories and Knowledge Management	Specialization module	MU 6
	Accounting I: Concepts & International	Specialization module	AF 6
	Accounting II: Valuation & Governance	Specialization module	AF 6
	Accounting III: Selected Issues	Specialization module	AF 6
	Accounting IV: In-depth questions	Specialization module	AF 6
	Selected Problems in Banking and Finance/Banking	Specialization module	AF 6
	Seminar Advanced Management Accounting	Specialization module	AF 6

	Seminar Digitalization and Process Management	Specialization module	II 6
	Seminar Empirical Finance	Specialization module	AF 6
	Seminar Empirical Marketing	Specialization module	MU 6
	Seminar Entrepreneurship and Innovative Business Models	Specialization module	II 6
	Advanced Financing and Banking Seminar	Specialization module	AF 6
	Seminar Marketing Theory	Specialization module	MU 6
	Seminar Organization, Personnel and Knowledge Management	Specialization module	MU 6
	Seminar Accounting and Business Valuation	Specialization module	AF 6
	Seminar Strategic and International Management	Specialization module	MU 6
	Seminar Strategic and International Management (Project)	Specialization module	MU 6
	Seminar Technology and Innovation Management	Specialization module	II 6
	Strategic Management	Specialization module	MU 6
	Strategic Management of Technology and Innovation: Case Studies	Specialization module	II 6
	Strategic Management of Technology and Innovation: Intellectual Property Management	Specialization module	II 6
	Corporate Taxation I	Specialization module	AF 6
	Corporate Taxation II	Specialization module	AF 6
	Corporate Taxation III	Specialization module	AF 6
	Business Valuation: Theory and Practice	Specialization module	AF 6
	Vertical marketing in theory and practice	Specialization module	MU 6
Mathematics and Computer Science (Dept. 12), Degree program BSc Data Science	Efficient Algorithms	Advanced module	Inf 9
	Continuous optimization	Advanced module	9
	Machine Learning	Advanced module	Inf 9
	Matrix Methods in Data Analysis	Advanced module	9
Mathematics and Computer Science (Dept. 12), Degree program MSc Data Science	Data Integration	Specialization module	Inf 6
	Information Retrieval	Specialization module	Inf 6
Economics (Dept. 02), Degree program MSc Economics and Institutions	Applied Institutional Economics	Advanced module	VWL 6
	Behavioral and Experimental Economics	Advanced module	VWL 6
	Development Economics	Advanced module	VWL 6
	Economic Policy	Specialization module	VWL 6
	Economics of Political Institutions	Advanced module	VWL 6
	Empirical Economics	Basic Module	VWL 6
	International Economic Policy	Specialization module	VWL 6

	International Institutional Economics	Advanced module	VWL 6
	Law and Economics	Advanced module	VWL 6
	Macroeconomics and Finance	Specialization module	VWL 6
	Monetary Economics	Specialization module	VWL 6
	Non-market institutions	Advanced module	VWL 6
	Political Economics	Specialization module	VWL 6
	Public Economics	Advanced module	VWL 6
	Seminar Advanced Institutional Economics	Advanced module	VWL 6
	Seminar on Economic Policy	Specialization module	VWL 6
	Seminar on Institutional Economics	Advanced module	VWL 6
	Seminar on Money, Accounting and Finance	Specialization module	VWL 6
	Theoretical Economics	Basic Module	VWL 6
	Theoretical Institutional Economics	Advanced module	VWL 6
	Topics in Institutional Economics Policy Abroad	Specialization module	VWL 6
	Topics in Money, Accounting and Finance Abroad	Specialization module	VWL 6
Mathematics and Computer Science (Dept. 12), Degree program BSc Computer Science	Graphics Programming	Advanced module	Inf 9
	Advanced Module Computer Science 1 (large)	Advanced module	Inf 9
	Advanced Module Computer Science 2 (large)	Advanced module	Inf 9
	Advanced Module Computer Science 3 (large)	Advanced module	Inf 9
	Advanced Module Computer Science 4 (large)	Advanced module	Inf 9
	Advanced Module Computer Science 5 (large)	Advanced module	Inf 9
	IT Security	Advanced module	Inf 9
	Advanced Module Computer Science 1 (small)	Advanced module	Inf 6
	Advanced Module Computer Science 2 (small)	Advanced module	Inf 6
	Advanced Module Computer Science 3 (small)	Advanced module	Inf 6
	Advanced Module Computer Science 4 (small)	Advanced module	Inf 6
	Advanced Module Computer Science 5 (small)	Advanced module	Inf 6
	Computer Networks	Advanced module	Inf 9
	Software Design and Programming Techniques	Advanced module	Inf 6
	Software Quality	Advanced module	Inf 9
	Software Engineering	Advanced module	Inf 6
Mathematics and Computer Science (Dept. 12), Degree program MSc Computer Science	Operating Systems	Specialization module	Inf 6
	Large Specialization Module Computer Science 1	Specialization module	Inf 9
	Large Specialization Module Computer Science 2	Specialization module	Inf 9
	Large Specialization Module Computer Science 3	Specialization module	Inf 9
	Large Specialization Module Computer Science 4	Specialization module	Inf 9
	Large Specialization Module Computer Science 5	Specialization module	Inf 9

	Implementation of Database Systems	Specialization module	[Inf] 9
	Index and Storage Structures	Specialization module	[Inf] 6
	Small Specialization Module Computer Science 1	Specialization module	[Inf] 6
	Small Specialization Module Computer Science 2	Specialization module	[Inf] 6
	Small Specialization Module Computer Science 3	Specialization module	[Inf] 6
	Small Specialization Module Computer Science 4	Specialization module	[Inf] 6
	Small Specialization Module Computer Science 5	Specialization module	[Inf] 6
	Artificial Intelligence	Specialization module	[Inf] 6
	Model-driven Software Development	Specialization module	[Inf] 9
	Multimedia Signal Processing	Specialization module	[Inf] 9
	Neural Networks	Specialization module	[Inf] 6
	Software Evolution	Specialization module	[Inf] 6
	Distributed Systems	Specialization module	[Inf] 6
	Virtual Machines	Specialization module	[Inf] 6
	Web Technologies	Specialization module	[Inf] 6
Mathematics and Computer Science (Dept. 12), Degree program BSc Mathematics	Algebraic geometry: Introduction	Advanced module	6
	Applied harmonic analysis I	Advanced module	6
	Discrete Geometry	Advanced module	6
	Elementary number theory	Advanced module	6
	Large Advanced Module Numerics/Optimization	Advanced module	9
	Group theory	Advanced module	6
	Small Advanced Module Numerics/Optimization	Advanced module	6
	Numerics (Basic Numerical Methods)	Advanced module	9
	Numerical analysis I	Advanced module	6
	Topological methods in data analysis	Advanced module	9
Mathematics and Computer Science (Dept. 12), Degree program MSc Mathematics	Algebras and their Representations	Specialization module	9
	Applied Harmonic Analysis II	Specialization module	6
	Approximation Theory	Specialization module	9
	Selected Topics in Numerical Analysis	Specialization module	6
	Fourier Integral Operators	Specialization module	9
	Functional Analysis	Specialization module	9
	Large Specialization Module Numerical Mathematics/Optimization	Specialization module	9
	Small Specialization Module Numerical Mathematics/Optimization	Specialization module	6
	Numerical Solution Methods for Finite Dimensional Problems	Specialization module	9

	Numerical Methods for Ordinary Differential Equations	Specialization module	6
	Numerical Solution Methods for Differential Equations	Specialization module	9
	Numerical Analysis II	Specialization module	6
Mathematics and Computer Science (Dept. 12), Degree program BSc Business Informatics	Database Systems	Advanced module	Inf 9
	Cloud Computing	Specialization module	Inf 6
Mathematics and Computer Science (Dept. 12), Degree program BSc Business Mathematics	Large Advanced Module Stochastics	Advanced module	9
	Small Advanced Module Stochastics	Advanced module	6
	Optimization I	Advanced module	6
	Personal Insurance Mathematics	Advanced module	3
	Statistics	Advanced module	9

Appendix 4: Export Module List

The current export opportunities is always published on the program website of the department offering the module as an export opportunity.

Any prerequisites or recommendations for participation as well as combination rules must be observed. If the department offering a module has specified combination rules and created export packages, depending on the scope of their own import window, only limited module course offerings will in fact be available.

The degree programs listed below can be selected at the time of the adoption of these Degree Program and Examination Regulations. The catalog of export opportunities can be changed or supplemented by the examination committee especially if the export opportunities change. Such changes will be published by the examination committee on the degree program website in accordance with §6.

§1 Export of curricular modules to other degree programs

The following modules as listed in Appendix 2 may also be taken as part of other degree programs, as long as this is agreed upon with the department(s) in whose degree program(s) these modules are elective.

Name of module *German translation*
Empirical Processes *Empirische Prozesse*
High-dimensional Statistics and Machine Learning *Hochdimensionale Statistik und maschinelles Lernen*
Large Specialization Module Stochastics *Großes Vertiefungsmodul Stochastik*
Mathematical and Nonparametric Statistics *Mathematische und nichtparametrische Statistik*
Non-Life Insurance Mathematics *Schadenversicherungsmathematik*
Optimization II *Optimierung II*
Probabilistic Combinatorics *Probabilistische Kombinatorik*
Probability Theory *Wahrscheinlichkeitstheorie*
Quantitative Risk Management *Quantitatives Risikomanagement*
Small Specialization Module Stochastics *Kleines Vertiefungsmodul Stochastik*

Name of module *German translation*
Small Specialization Module Stochastics without Tutorial *Kleines Vertiefungsmodul Stochastik ohne Tutorium*
Special Topics of Insurance Mathematics *Spezialthemen der Versicherungsmathematik*
Stochastic Processes *Stochastische Prozesse*
Stochastical Analysis *Stochastische Analysis*