



MSc Mathematical Finance and Actuarial Science

Information Session on the New Academic and Examination Regulations from September 16, 2021

September 30, 2021



Introduction

- This information session is relevant for you if
your master study started in the summer term 2021 or earlier
- Your options:
 - You can switch to the new academic and examination regulations from September 16, 2021 or
 - You can regularly finish your study according to the old academic and examination regulations from 2010



Significant changes in the new academic and examination regulations

- There is no compulsory course Stochastic Analysis. All courses are optional.
- Generalized Linear Models is now in the module catalogue Statistics.
- New courses Insurance Mathematics 1 and Insurance Mathematics 2 are in the module catalogue Actuarial Science.
- Financial Mathematics 1 and Financial Mathematics 2 replace old courses on financial mathematics.
- Quantitative Risk Management is in the module catalogue Actuarial Science as well.



Details – Part 1

- Stochastic Analysis with 6 ECTS is offered this winter term for the last time.
- The new Stochastic Analysis with 9 ECTS will be offered in the summer terms. This optional course is in the module catalogue Probability Theory
- Fundamentals of Mathematical Statistics replaces Time Series Models in the module catalogue Statistics
- You need 14 ECTS from Stochastics and can mix courses from Probability Theory and Statistics to achieve 14 ECTS



Details – Part 2

- If you pass/passed Quantitative Risk Management the you can decide whether it is counted for the module catalogue Mathematical Finance or for the module catalogue Actuarial Science.
- Depending on the focus, one should achieve **14** ECTS in the module catalogue Mathematical Finance and **9** ECTS in the module catalogue Actuarial Science **OR** **9** ECTS in the module catalogue Mathematical Finance and **14** ECTS in the module catalogue Actuarial Science
- Link to the new academic and examination regulations:
https://www.tum.de/studium/im-studium/das-studium-organisieren/satzungen-ordnungen?tx_in2tumstatutedatabase_pi1%5Baction%5D=download&tx_in2tumstatutedatabase_pi1%5Bcontroller%5D=Statute&tx_in2tumstatutedatabase_pi1%5BfileId%5D=P005615679&cHash=dca52588486d6210c160fcdcf8e21192



Your decision: the old academic and examination regulations

- Please pass the Stochastic Analysis with 6 ECTS this winter term.
- You can take the new modules since they are accounted in the old academic and examination regulations. However, there are some restrictions, especially if you already took discrete time finance, continuous time finance, portfolio analysis, non-line insurance, life insurance, health insurance and actuarial mathematics for pensions. With respect to restrictions, consult Aleksey Min (E-Mail: min@tum.de)
- Fixed Income Markets and Investment strategies are offered in this winter term



Your decision: the new academic and examination regulations

- Stochastic Analysis is not a compulsory course for you anymore.
- If you took discrete time finance, continuous time finance, portfolio analysis, non-line insurance, life insurance, health insurance and actuarial mathematics for pensions they can be recognized for the new courses. With respect to recognitions, consult Aleksey Min (E-Mail: min@tum.de)
- Note that Generalized Linear Models is not in the module catalogue Actuarial Science
- Portfolio analysis is a part of Financial Mathematics 1



Old examination regulations and Courses in Winter Term 2021/2022



Study Plan

A1.1 Basics (1 compulsory module in the WS)

- A1.2 Mathematical Finance
- A1.3 Actuarial Science
- A1.4 Stochastics
- A1.5 Mathematics
- A1.6 Management
- A1.7 Mathem. Modules from other Universities (up to 18 CP)
- A1.8 Manag. Modules from other Universities (up to 9 CP)

Seminar, internship, interdis. basics, Master's Thesis



in total: **120 CP**



Modules of our faculty (Sections A1.1 to A1.5)

Compulsory Module (WS)

A1.1 Basics (6 CP)

Modulnr.	Modulname	Sem.	SWS	CP	Dauer
MA4405	Stochastic Analysis	1	3V+1Ü	6	60-90 min

Maxxxx in red – will be offered in this winter term

A1.2 Mathematical Finance (optional module)

(min. 16 CP with specialization **Mathematical Finance**,
 min. 5 CP with specialization **Actuarial Science**)

A1.2.1 Core Modules in Mathematical Finance

Modulnr.	Modulname	Sem.	SWS	CP	Dauer
MA3701	Discrete Time Finance	1-3	2V+1Ü+1P	6	60-90 min
MA3702	Continuous Time Finance	1-3	2V+1Ü+1P	6	60-90 min
MA3703	Fixed Income Markets	1-3	2V+1Ü	5	60 min
MA5415	Quantitative Risk Management	1-3	2V+1Ü	5	60 min

A1.2.2 Modules on Special Topics in Mathematical Finance

The catalog is updated before the beginning of each term by the examination board and published on the internet.

- **MA3407** Financial Mathematics 1 (4V+2Ü, 9 CP) consisting MA3701 and MA4706
- **MA5709** Investment Strategies (2V+1Ü, 5 CP)



A1.3 Actuarial Science (optional module)

(mind. 14 CP with specialization **Actuarial Science**,
mind. 5 CP with specialization **Mathematical Finance**)

A1.3.1 Core Modules in Actuarial Science

Modulnr.	Modulname	Sem.	SWS	CP	Dauer
MA3442	Actuarial Risk Theory	1-3	2V+1Ü	5	60 min
MA3403	Generalized Linear Models	1-3	4V+2Ü	9	60-90 min
MA3451	Life Insurance	1-3	2V	3	60-90 min
MA3454	Non Life Insurance	1-3	3V	5	60-120 min

A1.3.2 Modules on Special Topics in Actuarial Science

The catalog is updated before the beginning of each term by the examination board and published on the internet.

- MA3405 Insurance Mathematics 1 (4V+2Ü, 9 CP)

A1.4 Stochastics (optional module)

(min. 9 CP in A1.4.1 or 9 CP in A1.4.2)

A1.4.1 Modules in Probability Theory

Modulnr.	Modulname	Sem.	SWS	CP	Dauer
MA3408	Markov Processes	1-3	4V+2Ü	9	60-90 min
MA5417	Large Deviations	1-3	2V+1Ü	5	60 min
MA4406	Probability on Graphs	1-3	2V+1Ü	5	60 min

A1.4.2 Modules in Statistics

Modulnr.	Modulname	Sem.	SWS	CP	Dauer
MA4401	Applied Regression	1-3	2V+1Ü	5	60 min
MA3402	Computational Statistics	1-3	4V+2Ü	5	60 min
MA3411	Time Series Analysis	1-3	2V+1Ü	9	60-90 min

- MA5441 Fundamentals of Mathematical Statistics (4V+2Ü, 9 CP)
- MA5439 Statistical Analysis of Copulas (2V+1Ü, 5 CP)



A1.5 Mathematics (optional module)

(min. 9 CP from A1.5.1 or A1.5.2 or A1.5.3)

A1.5.1 Modules in Numerics

Modulnr.	Modulname	Sem.	SWS	CP	Dauer
MA3303	Numerical Methods of Partial Differential Equations	1-3	4V+2Ü	9	60-90 min
MA4302	Computational Inverse Problems	1-3	2V+1Ü	5	60 min
MA4303	Advanced Finite Element Methods	1-3	2V+1Ü	5	60 min

A1.5.2 Modules in Optimization

Modulnr.	Modulname	Sem.	SWS	CP	Dauer
MA2504	Fundamentals of Convex Optimization	1-3	4V+2Ü	9	60-90 min
MA4502	Combinatorial Optimization	1-3	2V+1Ü	5	60 min
MA4503	Modern Methods in Nonlinear Optimization	1-3	2V+2Ü	5	60 min



A1.5 Mathematics (optional module)

(min. 9 CP from A1.5.1 or A1.5.2 or A1.5.3)

A1.5.3 Modules in Pure Mathematics

Modulnr.	Modulname	Sem.	SWS	CP	Dauer
MA3001	Functional Analysis	1-3	4V+2Ü	9	60-90 min
MA3005	Partial Differential Equations	1-3	4V+2Ü	9	60-90 min



Master's seminar:

Master's seminars deal with topical questions and challenges in the field, giving students the opportunity to delve deeper into the subject. Attending and passing at least one master's seminar is mandatory for graduation. When deciding on the topic of a master's thesis, please note that some chairs require the students to have passed one of their master's seminars in the respective field of expertise. Further information can be found on the website of the respective chair.

Master's thesis:

Students may suggest own topics provided that they pertain to the field of "Mathematical Finance and Actuarial Science". It is recommended and common practice to base the topic of a master's thesis on the knowledge and experience gained in the courses that have been undertaken so far. In addition to courses in financial mathematics and actuarial science, this may also include the subjects numerical analysis, mathematical optimization, stochastics, probability theory, as well as management. Detailed information is available on the website of the respective chair.

Internship

In preparation for working life, students of the master's program "Mathematical Finance and Actuarial Science" have to undertake a four weeks internship either in industry or at a research facility.

Subject academic regulations: Dr. Michael Ritter
Academic counseling: PD Dr. Aleksey Min
Email: master@ma.tum.de