

Introduction to the Master Programme *Mathematics*

Torsten Mütze

General Structure of the Programme

- **Much freedom** in choice of courses: there are **no compulsory, but only elective courses!**
- Mainly **lecture courses**, but also one **seminar**.
- Each semester, **different master courses** are taught. Offer depends on **availability of lecturers** and **demand by students**. Available courses can always be found on **eCampus** (<https://portal.uni-kassel.de/>, not very comfortable).
- Courses for **current semester**: see later!
- **Application minor** compulsory (details later)
- 6 credits in **additive key competencies** required.
- In the last semester, 6 months **research thesis** must be written (under the supervision of a professor). Topic usually builds on previously attended lecture course(s) or seminar.
- **Read the examination regulations!**
<https://www.uni-kassel.de/uni/studium/mathematics-master/examination-regulations>

One Possible Curriculum (here shown for minor in computer science)

Curriculum MSc Mathematics – Minor Computer Science																																				
Sem	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	CP
1	Elective module 1* 4 + 2 SWS 10c										Elective module 2* 4 + 2 SWS 10c										Elective module 3* 4 + 2 SWS 10c															30
2	Elective module 4* 4 + 2 SWS 10c										Elective module 5* 4 + 2 SWS 10c										Comp. Sci. 1 4 SWS 6c					Comp. Sci. 2 4 SWS 6c										32
3	Elective module 6* 4 + 2 SWS 10c										Seminar 2 SWS 6c						Additive key competencies 6c				Comp. Sci. 3 4 SWS 6c					28										
4	Master thesis and colloquium 6 months 30c																																			30
Sem	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	CP

* The six elective modules must cover at least three of the five fields *Analysis*, *Algebra*, *Discrete Mathematics*, *Numerics* and *Stochastic*.

Elective module	Seminar	Thesis	Appli- cation	Add. key competencies
--------------------	---------	--------	------------------	--------------------------

Such curricula are only **recommendations**! You are free to choose **any other** distribution of your modules over the semester. *From our side*, it is also no problem, if you need **more than four semesters**.

Another Possible Curriculum (here shown for minor economics)

Curriculum MSc Mathematics – Minor Economics																																									
Sem	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	CP					
1	Elective module 1* 4 + 2 SWS 10c										Elective module 2* 4 + 2 SWS 10c										Economics 1 4 SWS 6c				Additive key competencies 3c												29				
2	Elective module 3* 4 + 2 SWS 10c										Elective module 4* 4 + 2 SWS 10c										Seminar 2 SWS 6c				Economics 2 4 SWS 6c														32		
3	Elective module 5* 4 + 2 SWS 10c										Elective module 6* 4 + 2 SWS 10c										Economics 3 4 SWS 6c				Additive key competencies 3c												29				
4	Master thesis and colloquium 6 months 30c																																								30
Sem	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	CP					

* The six elective modules must cover at least three of the five fields *Analysis*, *Algebra*, *Discrete Mathematics*, *Numerics* and *Stochastic*.

Elective module	Seminar	Thesis	Application	Add. key competencies
-----------------	---------	--------	-------------	-----------------------

Typical Structure of Lecture Courses

- Master courses have typically the format **4+2**: each week, there are **four hours lectures** (two blocks à 90min) taught by the lecturer and **two hours tutorials** (one block à 90min) taught by a teaching assistant (usually a Ph.D. student).
- The **lectures** start in the **first week** of the lecture period; the **tutorials** in the **second week**.
- Every week an **exercise sheet** is handed out which must be **solved** and **returned to the teaching assistant**. Only if you achieve **sufficiently many points**, you are admitted to the **final exam** of the course.
- The tutorials are also the place to **ask questions** in case of problems with the materials of the lecture course. Use it!
- Most courses are accompanied by a **Moodle course**; details and other organisational information are provided in the first lecture. Thus: *please attend the first lecture!*
- **Remote students should contact the lecturers of their courses in advance and inform them about their participation.**

How to Enrol into a Course?

- **Simply go there for the first lecture!** (The eCampus offers sometimes strange buttons for registration/enrolment whatever – in mathematics, we do **not** use these).
- Before the end of the semester, you must first register for the so-called **non-graded learning assignments** (German: Studienleistung). If you have achieved enough points on the exercise sheets, the teaching assistant will then mark in the system that you have passed. After that you must register for the **exam** (German: Prüfungsleistung). You **cannot** do this before you got the non-graded learning assignment.
Note: no lecturer is allowed to examine you, if you are not registered for the exam!
- In case of **problems**: speak with your lecturer and/or contact the **examination office** (German: Prüfungsbüro).
- **Special case: seminars**. There is usually a **preliminary meeting** where the topics are distributed among the participants.

Lecture Courses and Seminars this Semester

Standard 4+2 Courses

- **Discrete Mathematics I (Graph Theory)** (Discrete Mathematics, Tue 13-15, Thu 09-11, Mütze)
- **Optimization III** (Discrete Mathematics, Wed 09-11, Thu 09-11, Bley)
- **Functional Analysis** (Analysis, Wed 11-13, Thu 11-13, Disser)
- **Eventually Positive Semigroups** (Analysis, Tue 15-17, Thu 11-13, Hussein)
- **Numerical Methods for Linear Equations** (Numerics, Mon 11-13, Fri 9-11, Meister)
- **Numerics of Ordinary Differential Equations** (Numerics, Tue 11-13, Wed 11-13, Friedmann)

Non-standard 2+1 Course (continued previous / next semester to make it to a 4+2 course)

- **Computer Algebra I (Part B)** (Algebra, Wed 11-13, Seiler)
- **Cryptography and Coding Theory (Part A)** (Algebra, Mon 16-18, Petersen)

Lecture Courses and Seminars this Semester

Seminars

- **Numerics** (Numerics, Tue 9-11, **Friedmann**)

Application Minor

- You need **18 credits** in a second subject, the **application minor**.
- Four possible **choices**:
 - **Computer science** (different department on campus *Wilhelmshöher Allee*)
 - **Economics** (different department on campus *Holländischer Platz*)
 - **Physics**
 - **Nanosciences**(German speaking students may also choose some **engineering programmes**.)
- **Note:** you have to attend **master courses** in your application minor which typically assume knowledge from some bachelor courses!
- Think **early** about your application minor and inquire about **required prerequisites**! Get some counselling on your options!

Additive Key Competencies

- Usually, **no big choice** available.
- Courses offered from all departments – **centralised list** for whole university. See the Vorlesungsverzeichnis
<https://portal.uni-kassel.de/qisserver/rds?state=wtree&search=1&trex=step&root120221=200077%7C200678&P.vx=kurz>
- Our recommendation: choose some **language courses** (English, German, ...) offered by **language center** of university.

General Advice for Successfully Studying Mathematics in Kassel

- We are a **small institute** – not many students, not many professors – with a „family atmosphere“. Try to become **part of the family**: get into contact with your fellow students, but in case of problems/questions also with your **lecturers** (either after a lecture or arrange an appointment via e-mail).
- As a **non-German speaking student** contact your lecturers **before the course starts** and inform them about your participation. This ensures that the course will be taught in **English**!
- Opposed to many other countries, German **bachelor programmes** include already a lot of **abstract mathematics** and **proofs** play a much bigger role than **computations**. Our **master programme** assumes **familiarity with this material**! We are in the process of building an **OpenMoodle course** called *Bridging the Gap: Mathematics* to help you to learning:
<https://openmoodle.uni-kassel.de/course/view.php?id=372>
Analogous courses exist for Physics and Nanosciences (they are already more complete than the Maths course).

Where to Get Help?

There are many places where you can get help for various problems:

- **Mathematical problems:** fellow students, teaching assistants, lecturers
- **Administrative problems:** students office (department, university), examinations office (department)
<https://www.uni-kassel.de/fb10/institute/mathematik/studium-und-lehre/studienberatung-am-institut>
<https://www.uni-kassel.de/fb10/en/organization/exam-office-german>
<https://www.uni-kassel.de/uni/studium/mathematics-master/contact-and-examination-office>
- **Problems as foreign student:** International Office
<https://www.uni-kassel.de/uni/international/kontakt-und-service/international-office>

The **Fachschaft** (student body of the institute) is also quite helpful:
<https://www.uni-kassel.de/fb10/organisation/fachschaft>