UNIKASSEL
VERSITÄT

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	Appli-cation	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 organisatorial 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 assistent 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 15-17, Thu 09-11, **Mütze**)
- **Calculus of Variations** (Analysis, Tue 13-15, Thu 13-15, **Knees**)
- **Functional Analysis** (Analysis, Wed 11-13, Fr 09-11, **Fuest**)
- **Measure and Probability Theory** (Stochastics, Mon 09-11, Fr 09-11, **Lindner**)
- **Applied Statistics** (Stochastics, Mon 13-15, Fr 13-15, **Antoni**)
- **Numerics of ordinary differential equations** (Numerics, Wed 09-11, Fr 08-10, **Meister**)
- **Finite Element Methods** (Numerics, Mon 09-11, Tue 09-11, **Friedmann**)

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

- **Computer Algebra I (Part B)** (Algebra, Tue 11-13, **Seiler**)

Lecture Courses and Seminars this Semester

Seminars

- **Analysis** (Analysis, Tue 9-11, **Disser** (karoline.disser@mathematik.uni-kassel.de))

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.
- Department **covers fees for language courses** (at most 3 per student)

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 adjust:
  https://openmoodle.uni-kassel.de/course/view.php?id=372
  Analogous courses exist for Physics and Nanosciences

Where to Get Help?

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

- **Mathematical problems**: fellow students, teaching assistents, 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