Department of Mathematics
Technical University of Munich

Examination Regulations

Two Years in Your Life. How to Structure Your Studies.

Dr. Michael Ritter

Winter 2018

1 The Credit Point System

> **Credit Points**
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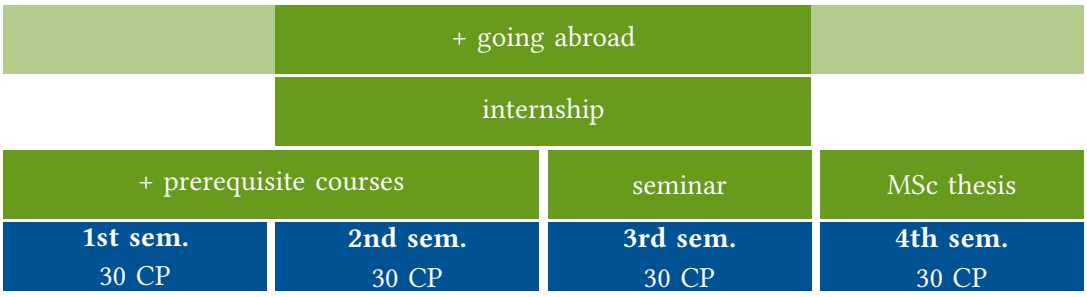
> - 1 CP ≈ 30 hours of work
> - includes contact hours, self study, exam
> - total workload: 120 CP over four semesters

For each course you pass, you are awarded a number of credit points (CPs). One CP is roughly equivalent to a total workload of 30 hours, thus the estimated workload for a course determines the number of credit points awarded. The calculation of the estimated workload includes not only the contact hours (lectures and tutorials), but also homework, self study, exam preparation and the exam itself. Hence the number of credit points of a course will give you an idea of how much work should (on average) be put into the course.

The program requires you to collect 120 CP in total. With a workload of 30 CP per semester, you are expected to finish within 4 semesters (2 years). If you have any prerequisite courses, these will be on top of the 120 CP, so your workload would then be a little more. Your lesson plan should generally aim at getting around 30 CP per semester. Other than these (and some other) rough guidelines, you are responsible for your schedule yourself—there is no fixed schedule prescribed by the university.

2 Program Timeline

The following is a possible outline of your studies.



3 Modules and Module Descriptions

> **Modules**
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> - credits awarded for successfully passed modules
> - module descriptions contain detailed information
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> `https://campus.tum.de`

Details on each course can be found in the module description. Among other information, the module description contains the number of credit points awarded, a breakdown of the total workload into contact hours and self study, whether a course usually takes place in summer or in winter, information on the examination and on the topics covered in the course. You can access these descriptions on TUM-Online in a number of ways:

- Log in to TUM-Online at `https://campus.tum.de` and open your curriculum. It contains all the modules that can be completed in your program. To access the module description, click on the “book” icon next to the course title.

- Go to `https://campus.tum.de`, select “Academic Departments” – “Mathematics” in the navigation on the left and click on “Degree Programmes”. Choose a degree program that you want information on and you will again get the curriculum for that program. The module descriptions are available through the “book” icon.
- Go to `https://campus.tum.de` and use the search function to access the module handbook. Searching for the module number (or the title) takes you to the module description.

? Module Descriptions

How many credits are awarded for the course “Combinatorial Optimization”? What is the estimated workload for that course?

4 The Balance Sheet

Apart from the total credit requirement of 120 CP, there are more detailed requirements for certain sections of the module catalog. Here, some things are the same for all master’s programs, other things differ by program. A summary of the common requirements is illustrated in fig. 1.

Balance Sheet

- 77 CP graded, 13 CP ungraded
- consult appendix 1 of FPSO for specific regulations

`https://www.ma.tum.de/de/studium/studienorganisation/pruefungen.html`

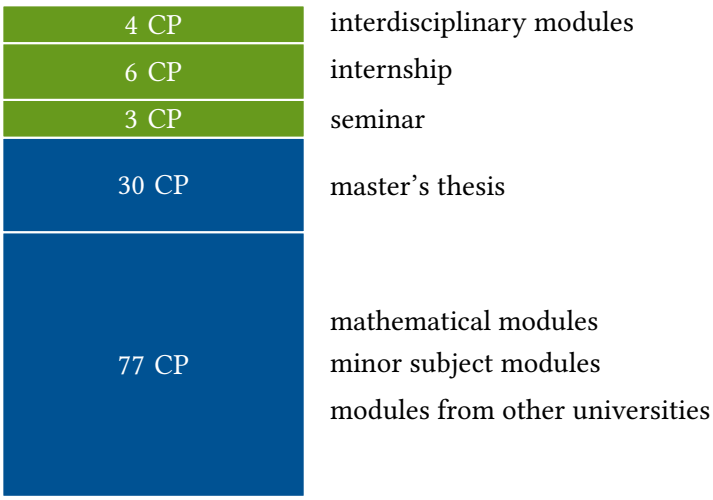

Figure 1: credit points balance sheet

You are required to complete an internship with internship seminar (more on that at a different station), one seminar and 4 CP worth of “interdisciplinary modules” (more on that at a different station). These 13 CP of modules are not graded (or if they are, the grades do not count towards your final grade).

The difference of the master’s programs is in the master’s thesis (attention: a thesis for one program will not be recognized for a different program!) and in the 77 CP of mathematical and minor modules. The “Modules from other Universities” are meant for credits that you earn at other universities while studying abroad for one semester. There is more on that topic at a different station.

Specific regulations for the 77 CP block can be found in the FPSO for your specific program (available at `https://www.ma.tum.de/de/studium/studienorganisation/pruefungen.html`). Have a look at “Anlage 1”, where you can find a listing of the courses in different sections (more current version of these may be available on TUM-Online) together with the relevant CP limits for each of these sections. As this is an official legal document, the FPSO is unfortunately only available in German. However, an inofficial translations is available for some of the programs. If in doubt about any regulations, please do not hesitate to ask!

As an example, let us have a look at the regulations for the program “Master in Mathematics”. Figure 2 shows an excerpt of “Anhang 1” of the current FPSO for that program.

Wahlmodule

Es müssen die folgenden drei Bedingungen erfüllt werden:
Aus drei verschiedenen der Abschnitte A1.1 bis A1.4 und A1.6 müssen je mind. 9 CP erbracht werden.
Aus den Abschnitten A1.1 bis A1.5 müssen insgesamt mind. 50 CP erbracht werden.
Aus den Abschnitten A1.1 bis A1.6 müssen insgesamt mind. 77 CP erbracht werden.

Die Kataloge zu den Abschnitten A1.1.2, A1.2.2, A1.3.2, A1.4.2 werden jeweils vor Semesterbeginn vom Prüfungsausschuss aktualisiert und im Internet veröffentlicht.

A1.1: Analysis

A1.1.1: Core Modules in Analysis

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
MA3081	Dynamical Systems	1-3	4V+2Ü	9	60-90 min
MA4064	Fourier Analysis	1-3	2V+1Ü	5	60 min

A1.1.2: Modules on Special Topics in Analysis

Modulnr.	Modulname	Sem.	SWS	CP	Dauer
	Auswahl aus jeweils aktualisiertem Katalog				

Figure 2: excerpt of appendix 1 of FPSO for the program “Master in Mathematics”

The FPSO lists the following sections:

A 1.1 Analysis

A 1.2 Algebra, Geometry and Discrete Mathematics

A 1.3 Probability Theory, Statistics and Financial Mathematics

A 1.4 Numerics, Scientific Computing, Nonlinear Optimization and Model Building

A 1.5 Mathematics Modules from other Universities

A 1.6 Mathematical Theories in other Disciplines

The requirements are listed above the sections in this case:

- You need to have 9 CP or more in three different sections among A1.1, A1.2, A1.3, A1.4, A1.6.
- You need to have at least 50 CP in sections A1.1 – A1.5 combined.
- You need to have at least 77 CP in sections A1.1 – A1.6 combined.

? Credit Point Requirements

- Take a look at your program’s FPSO. Which sections and CP requirements are there?

5 Course Registration

No registration is required for most math courses. You can register on TUM-Online to display the course in your personal timetable and to enable the lecturer to send you messages. There are, however, a few important exceptions to this rule; most of these registration requirements come with a deadline.

Course Registration

- mostly not required, but recommended
- tutorial may require registration
- seminars, case studies, exams *do* require registration
- other faculties may handle this differently
- exams *always do* require registration

Seminars require prior registration. Seminar registration takes place at the end of each semester for the following semester. It will be announced by email and employs a two-rounds system: In the first round, you register for your favourite seminar. If the seminar is overbooked, your registration might be cancelled. In that case, you get a chance to register for one of the remaining seminars in a second round.

Case Studies Discrete/Nonlinear Optimization take place during the summer term and require prior registration. Usually, an information meeting takes place during the last two weeks of the winter term. Registration starts after this meeting and usually ends by the end of February (exact date may change).

Tutorials may require registration in some cases. This is usually announced on the course website and/or during the first course unit.

All exams require registration. Exam registration is announced on the website and by email. If you fail to register for an exam, you will not be able to take it.

Other faculties may have different registration requirements! This might be important for your minor.

? Registration Requirements

Which courses in your study plan require prior registration? Make a note in your calendar to register for these courses on time!

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Two Years in Your Life. How to Structure Your Studies. (Data Science edition)

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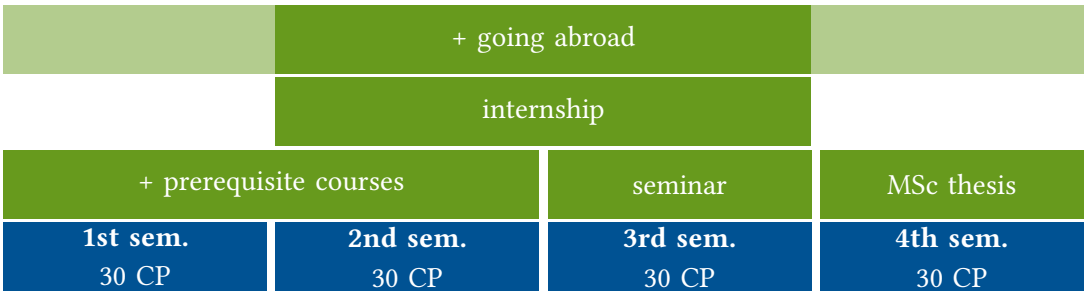

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? Module Descriptions

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4 The Balance Sheet

Apart from the total credit requirement of 120 CP, there are more detailed requirements for certain sections of the module catalog. Here, we describe the regulations for the master program “Mathematics in Data Science”. A summary of the requirements is illustrated in fig. 1.

Balance Sheet

- required modules
- elective modules
- support electives
- consult appendix 1 of FPSO for specific regulations

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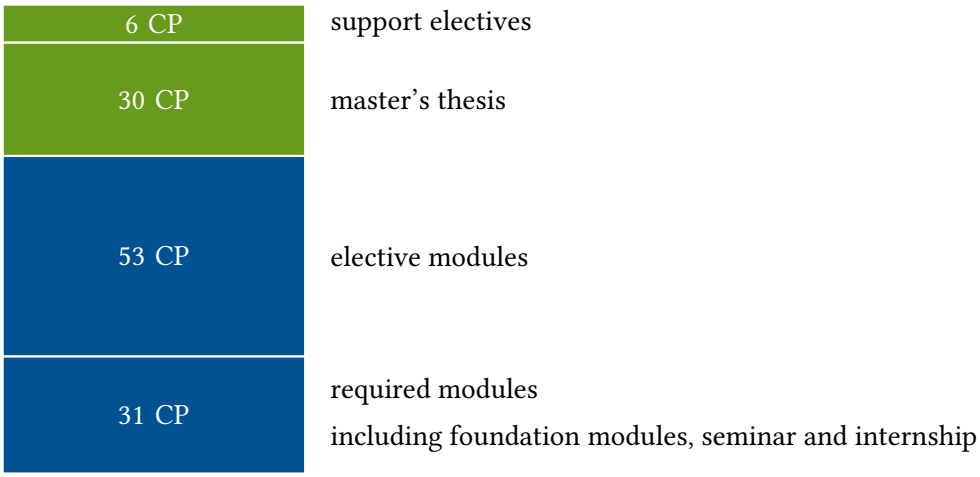

Figure 1: credit points balance sheet

“Required modules”: You are required to complete an internship with internship seminar (10 CP, more on that at a different station), one seminar (5 CP) and the basic level modules “Foundations in Data Engineering” and “Foundations in Data Analysis” (each 8 CP). However, students can attend the module “MA8113 TUM Data Innovation Lab” instead of doing an internship. These 31 CP of modules are part of the block A in the FPSO.

“Elective modules”: A total of 53 credits must be earned from the elective modules in B1.1, B1.2, B2.1, B2.2, B3 and from elective modules in the elective modules catalog of the Master’s program in Mathematics. The modules must meet some minimum credit conditions that are stated in detail in the FPSO:

- B1.1 Data Analysis, B2.1 Data Analytics, B3 Data Engineering: A total of at least 15 credits must be earned from these three areas, whereas at least one module must be chosen from each one of them.
- B1.2 Advanced Topics in Data Analysis, B2.2 Special Topics in Analytics: A total of at least 25 credits must be earned from these two areas

- B1.2.1 Core Modules in Data Analysis, B1.2.2. Core Modules in Machine Learning: Credits must be earned in each of these two areas.

Furthermore you can also earn credits at other universities while studying abroad for one semester. There is more on that topic at a different station. However, if there is no 1:1 recognition, these modules are not part of the containers A, B or C.

"Support electives": A total of at least 3 credits must be earned from the elective modules listed in the elective course catalog "Support Electives of the Master's program in Mathematics". Furthermore, a total of at least 3 credits must be earned from the elective modules listed in the elective course catalog "Social and Political Aspects of Data Science" of the Munich Center for Technology in Society (MCTS).

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? Credit Point Requirements

- Take a look at your program's FPSO. Can you find the credit point requirements of the elective modules block?
- Consider your study plan for this summer term: Are there any credit point requirements that you could already check off after successfully completing this semester? How about after the first two semesters?
- Again, consider your study plan for the first two semesters. Excluding the master's thesis, where would you still need credits in your third semester? How limited would your choice of courses be then?

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