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Examination Regulations
Warning on Prerequisites

- prerequisites **must** be passed within first year
- **no extensions** for prerequisites
- “backup”: apply for different master’s program (observe deadlines)
- especially important for 2nd semester exams
München, [Lösungspfad]

Zulassungsbescheid Mathematical Finance and Actuarial Science Masterstudium [Master of Science] Wintersemester 2017/18, Einstiegssemester 1

Sehr geehrte Frau [Lösungspfad]

wir freuen uns, dass wir Sie für den oben genannten Studienplatz zulassen können. Als nächsten Schritt möchten wir Sie bitten, Ihren Studienplatz in Ihrem TUMonline Bewerberkonto anzunehmen. Die Studienplatzannahme ist Voraussetzung für die Einschreibung (Immatrikulation) an der Technischen Universität München.

Diese Zulassung gilt vorbehaltlich der Erfüllung von folgenden Auflagen:

* Modulauflage: [VK] [MA2409] Wahrscheinlichkeitstheorie
Rechtsverbindlich ist der Zulassungsbescheid in der deutschen Fassung! The German version of the letter of admission is legally binding!

Munich, [Redacted]

Letter of admission Mathematical Finance and Actuarial Science Master's program [Master of Science] Winter semester 2017/18, Entrance semester 1

Dear Ms. [Redacted]

we are pleased to inform you that you have been admitted to the program specified above. If you wish to accept this offer of admission, you must do so officially in to your applicant account in TUMonline. Your official acceptance of this offer of admission is a prerequisite for enrollment at the Technical University of Munich.

This admission is only valid if the following requirements are fulfilled.

* Modulaufgabe: [VK] [MA2409] Wahrscheinlichkeitstheorie
Master in Mathematics

- major changes in study regulations
- restructured module catalog
- module catalog update
- optional area of specialization
Master in Mathematics

- major changes in study regulations
- restructured module catalog
- module catalog update
- optional area of specialization

(details: October 17th, 18:00 at MI HS 1)
Meet My Company: die nächsten Termine

Hier finden Sie die Termine und Informationen zu den Meet My Company-Veranstaltungen im Wintersemester 2019/20:

Meet My Company: Fisalis
Meet My Company mit Fisalis am 11. Dezember 2019 um 16:00 Uhr im Raum MI 00.10.011. Melden Sie sich bis zum 9. Dezember an!

Meet My Company: Oliver Wyman
Meet My Company mit Oliver Wyman am 28. November 2019 um 16 Uhr im Raum MI 00.10.011. Melden Sie sich bis zum 25. November an!

Meet My Company: Deloitte
Meet My Company mit Deloitte am 07. November 2019 um 16 Uhr im Raum MI 00.10.011. Melden Sie sich bis zum 04. November an!

Meet My Company: 3DS
Meet My Company mit 3DS am 05. November 2019 um 00.10.011. Bitte melden Sie sich bis zum 04. November an!

Meet My Company: dSPACE
Meet My Company mit dSPACE am 29. Oktober 2019 um 16 Uhr im Raum MI 00.10.011. Melden Sie sich bis zum 25. Oktober an!

Anmeldung und weitere Infos: www.ma.tum.de/meetmycompany

FIT FOR TUMORROW DAY 2019
Die Erfolgsformel für deine Karriere

Save the Date: Freitag, 15. November 2019
Welcome to the Department of Mathematics

Beginner’s Café 14:00 – 15:30 p.m. today
Magistrale, behind the tree
Worksheets

- 4 sheets
- 15 minutes per sheet
- work in groups (by program)
- read and discuss text
- ask questions
- materials at

  campus.tum.de
  www.ma.tum.de

  find your program’s homepage for information & links
1 The Credit Point System

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.

<table>
<thead>
<tr>
<th>1st sem.</th>
<th>2nd sem.</th>
<th>3rd sem.</th>
<th>4th sem.</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 CP</td>
<td>30 CP</td>
<td>30 CP</td>
<td>30 CP</td>
</tr>
</tbody>
</table>

+ prerequisite courses

+ going abroad

+ internship

MSc thesis

seminar

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.

| 4 CP       | interdisciplinary modules |
| 6 CP       | internship               |
| 3 CP       | seminar                  |
| 30 CP      | master’s thesis          |
| 77 CP      | mathematical modules     |
|            | minor subject modules    |
|            | modules from other universities |

| 3 CP      | seminar                  |
| 6 CP      | internship               |
| 4 CP      | interdisciplinary modules |

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 2”
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 unofficial translation is available for some of the programs. If in doubt about any regulations, please do not hesitate to ask!

### Credit Point Requirements

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

### 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.

**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!
1 The Credit Point System

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.

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</tbody>
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+ going abroad

+ internship

+ prerequisite courses

+ seminar

+ MSc thesis

3 Modules and Module Descriptions

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.

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>How many credits are awarded for the course “Combinatorial Optimization”? What is the estimated workload for that course?</td>
</tr>
</tbody>
</table>

### 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.

<table>
<thead>
<tr>
<th>6 CP</th>
<th>support electives</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 CP</td>
<td>master’s thesis</td>
</tr>
<tr>
<td>53 CP</td>
<td>elective modules</td>
</tr>
<tr>
<td>31 CP</td>
<td>required modules including foundation modules, seminar and internship</td>
</tr>
</tbody>
</table>

**Balance Sheet**

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

[https://www.ma.tum.de/de/studium/studienorganisation/pruefungen.html](https://www.ma.tum.de/de/studium/studienorganisation/pruefungen.html)

“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).

Specific regulations 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 unofficial translation is available for the master’s program “Mathematics in Data Science”. If in doubt about any regulations, please do not hesitate to ask!

? 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?

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.

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.

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
Registration Requirements

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

Examination Time — Exams and Recognitions

Dr. Michael Ritter

Winter 2019/20

1 Forms of Examination

Different possible forms for an examination are outlined in the FPSO. However, not all of these are common in Mathematics. The following list contains the most prominent forms of examinations at the math faculty. However, examiners are free to change the form of examination and the details (such as open book or closed book) as long as they announce it some time prior to the exams. Also, other forms of examination are possible and are used in some cases. If in doubt, please consult your respective examiners.

**written exam:** These test your ability to solve problems in a limited amount of time, often 60 or 90 minutes (sometimes more for minor subjects). For possible problems, have a look at problem sheets, homework and tutorials of the course, the exam problems will usually be similar to the problems discussed there. Whether an exam is open or closed book is determined by the examiner. The grades for a written exam are announced via TUM-Online. You may inspect your exam upon request, most examiners schedule an inspection for all interested students after the exam has been graded. Most written exams are in English, exceptions are possible for some bachelor level courses, very few computer science modules and some minor modules. You can request a summary sheet in English (for German exams) or in German (for English exams) from the examiner by applying no later than 14 days prior to the examination date.

**oral exam:** For courses with few participants, written exams are often replaced by oral exams. An oral exam takes about 20-30 minutes and tests your abilities to reproduce and apply concepts learned in the course, your understanding of the connections between the topics covered and your ability to deal with new challenges. The grades for an oral exam are often given right after the examination. Oral exams may be conducted in German or in English. Dates are scheduled by the examiner, sometimes upon request, so be sure to contact your examiner and ask for the examination date and time.

**seminar:** Seminars usually require you to give a talk of 60-90 minutes. Professors may set more or different requirements (e.g., a different time, a short written summary). Be sure to consult with your professor early to be aware of the formalities.

Technische Universität München is offering workshops, “study skills days” and online material to help you organize your learning and adapt to the German examination system more quickly. Details on the programs are available at the ProLehre website: [http://www.prolehre.tum.de/lernkompetenz/](http://www.prolehre.tum.de/lernkompetenz/)

Research the examination period (both first take and resit) for this summer term at [https://www.ma.tum.de/de/studium/studienorganisation/pruefungen.html](https://www.ma.tum.de/de/studium/studienorganisation/pruefungen.html). Make a note in your calendar to not book any holidays for these periods.
2 Resit Exams

For math courses, there are normally two examination dates at the end of the semester where a course is given. The first date is a few weeks after lectures end, the second date is a few days before lectures for the following semester start. The idea is that you can get a second try in case you failed the first attempt, but you are free to only go the second date if you wish to do so. However, there is no possibility to resit an exam beyond these two regular dates, so if you fail at the second date you will have to wait until the lecture is offered again (which may be never for some special courses).

These regulations may be different for other departments: Some offer a resit exam at the end of each semester (instead of two at the end of one semester), some do not offer resit exams at all. Please be sure to ask the lecturer about this if you cannot find this information for a course.

You may take resit exams for failed exams as often as you wish (as long as you are allowed to continue with your program and as long as the course is offered—you will learn more on that at a different station). However, it is not possible to resit an exam that you have already passed, passing grades are final.

Seminars are a special case: If you fail to pass your seminar, the examiner is not obliged to offer another chance. Instead, you can register for another seminar in the coming semester for your resit exam.

3 Exam Registration

To take an exam, you have to register for it within a certain timeframe using TUM-Online. Current dates may be found on https://www.ma.tum.de/de/studium/studienorganisation/pruefungen.html. If you fail to register, you will not be able to take an exam! Registration for the resit exams is separate. In particular, if you plan on only doing the resit exams, you do not need to register nor show up for the first examination date. If you register for an exam but then do not show up, a grade of 5.0 will be recorded. However, only passed exams will show up on your final transcript. Please be aware that exam registration and registration for a course on TUM-Online are two different things. So even if you registered for a course, it is still necessary to register for the exam separately!

While not strictly necessary, it greatly helps the exam organizers if you de-register from an exam that you registered for but ultimately decided not to take. You may cancel your exam registration on TUM-Online up to a week before the examination date.

* Find the deadlines for exam registration for this summer term. Make a note to register in your calendar right now!
* Do the same thing for the resit exams, even if you are not planning on taking any resit exams.
4 Exams Taken at Other Universities

If you take an exam at a different university (e.g. when you spend a semester abroad), you can apply for a recognition of that course for your degree. Generally, such a course must be a master level course (and you will need some kind of certificate to prove this, e.g. a module description). For universities with a four-year bachelor program we also accept courses intended for the last year of that bachelor program (again, some official documentation proving this fact is necessary). There are different options for getting a recognition.

For either type of recognition, please use the appropriate forms available on [https://www.ma.tum.de/de/studium/studienorganisation/pruefungen.html](https://www.ma.tum.de/de/studium/studienorganisation/pruefungen.html).

### 4.1 1:1 Recognition

If there is a module at TUM that covers roughly the same contents at the same level, you may apply for a 1:1 recognition. The course will then be treated as a replacement for the TUM module. In particular, the module will be used in the same sections of the FPSO as the TUM module and count towards the respective credit limits.

- For a 1:1 recognition, the number of credits you get is always the minimum of the credits for the course itself and for the corresponding TUM module.

- You cannot use a course eligible for 1:1 recognition and the corresponding TUM module towards your degree (this also applies if you choose to not apply for 1:1 recognition).

- For a 1:1 recognition, equality of the module has to be accredited by the module responsible for the respective TUM module (listed on the TUM module description).

### 4.2 Recognition as “Mathematics Module from Other Universities”

For all master’s programs mathematical modules from other universities can be recognized with a limit of 18 credit points. The FPSOs contain a specific section for this type of recognition and eligibility of the module has to be accredited by the academic advisor for your program. Again, it is not possible to use any module from other universities if you are also including a TUM module with the same contents. For the program “Mathematics in Data Science”, the limit is 30 credit points, where modules from mathematics and informatics may be recognized if they fit into the study program.

### 4.3 Recognition as “Minor Module from Other Universities” (does not apply to “Data Science”)

For non-mathematical modules that fit into your minor, it may be possible to recognize the module in the respective section of the FPSOs. Again, there is a specific section for that in the FPSOs and the module will have to be accredited by your academic advisor.
### 4.4 Recognition as “Interdisciplinary Modules”

For modules that are neither mathematical nor related to your minor (if you have any), you may apply for a recognition as interdisciplinary module. If the module is a language course at basic level, up to 3 CP may be recognized, otherwise the module may be recognized with its original credit points.

<table>
<thead>
<tr>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are there any courses that you would like to get recognized? Which form of recognition is suitable?</td>
</tr>
</tbody>
</table>
Examination Regulations

What Could Possibly Go Wrong?

Dr. Michael Ritter

Winter 2019/20

While you do have a lot of freedom during your program, there are some things that better not go wrong. At this station, you are going to learn what to watch out for.

1 Additional Requirements

Do you have any additional requirements? You can find out by looking at your “Zulassungsbescheid” which you can download on TUM-Online. If additional requirements are mentioned there, you have to successfully complete all of these modules within your first year. Be aware that most modules are only offered every other semester, so you will only have two tries for each of these additional requirements (first examination date and retake examination date).

While you have to complete these additional requirements, the credits and grades you earn here do not count towards your program. The only important thing is to successfully complete the requirements courses during your first or second semester. So be sure to plan for the extra work.

Some of the requirements might be offered in German only. If this is a problem, please ask the lecturer for English literature on the subject, she will be able to give you a few pointers. For the exam, you can ask for an English summary sheet and give the answers in English. If you need the summary sheet, please apply for that early, at least 14 days before the examination date, by writing to the respective lecturer. In some cases, you will also be offered the option to do an oral examination in English instead of the written exam which will then be graded as “pass/fail” only (instead of a detailed grade). If you need any of these options, please be sure to consult with our international relations coordinator Julia Cyllok as early as possible.

In addition, if you did not submit proof of German language proficiency with your application, you will usually be required to present a proof of basic German language skills knowledge as an additional requirement. Again, you have to provide this proof during your first year, but you were probably planning on taking a German course anyway. In addition to such a course, we will regard any successfully passed module during your first year as proof that you were able to master German at a level that enabled you to stay afloat and navigate German bureaucracy sufficiently well, so with your first passed module the German language skills requirement will be considered passed.

If you fail to complete these requirements on time, you will be suspended after your second semester. However, there might the possibility of changing to a different program (possibly with other additional requirements) to get yet another try at these requirements. If you manage to complete them then, you may change back to your original program and have the requirements marked as completed. You should, however, be aware that changing programs does require a regular application within the application deadlines. These do end well before the respective semester starts, so be sure to plan early if you might need to exercise that option! You can always decline the place you would be offered, so apart from the work spent on your documents an application for a different math program will not hurt you. Do not hesitate to contact with your academic advisors if you need advice on that.
Additional Requirements

- Download your “Zulassungsbescheid” on TUM-Online and check whether you have any additional requirements listed.
- If you have any additional requirements, when is your next chance to take the respective courses? Are the courses in German or in English?
- If you have any additional requirement to complete during your second term, think about applying for a different program as a backup for your third term.

2 Fundamental Modules

Each program defines a selected number of fundamental modules. These are defined in §38 of your respective FPSO. At least one of these core modules has to be passed successfully by the end of your second semester. As these modules are at the heart of your respective program, that should really not be a hard restriction. But be sure to watch out for that in case you plan to go abroad and/or do a long internship during your first year. Should you fail to comply with this requirement, you will be permanently suspended, i.e., you will not have the possibility of applying for that particular program again.

Fundamental Modules

- Consult your respective FPSO to find out about the fundamental modules of your program! (Do not confuse those with “core modules” contained in some FPSOs.)
- Which of these modules did you plan to take during your first and second semester? If you fail one or two of these, would that be a problem?

3 Regular Study Progress

During your studies, you are required to earn a certain number of credits each semester. Examination regulations require a regular progress as detailed in the table below. This rule implies that the maximum duration of your program is 6 semesters. Failure to show the required progress will lead to permanent suspension, i.e., you will not be able to resume the program. Please note that credits from additional requirements do not count towards your program, so they will also not count towards the study progress requirements.

<table>
<thead>
<tr>
<th>by the end of</th>
<th>you need at least</th>
</tr>
</thead>
<tbody>
<tr>
<td>your 3rd semester</td>
<td>30 credit points</td>
</tr>
<tr>
<td>your 4th semester</td>
<td>60 credit points</td>
</tr>
<tr>
<td>your 5th semester</td>
<td>90 credit points</td>
</tr>
<tr>
<td>your 6th semester</td>
<td>120 credit points</td>
</tr>
</tbody>
</table>
4 Things are Starting to Go Downhill ...

The most important rule: If there is a chance that you might get into trouble, please consult with your advisors (Julia Cyllok for international students, Michael Ritter for all master’s programs in Mathematics, your academic advisor for all questions specific to your subject) early! Please keep any documentation that might provide proof for a valid reason for your problem, e.g., medical certificates in case of prolonged illness. Depending on your individual situation, we will explore the possible options for dealing with the difficulties you facing.

5 Leave of Absence and Parental Leave

Under some circumstances there is a possibility of taking a leave of absence. That means that your semester count does not increase during that time (usually one semester) which might be important for your study progress requirements. Please note that additional requirements and core module requirements are not affected by a leave of absence! A leave of absence may be applied for if you have any of the following reasons:

- parental leave or caring for a close relative
- prolonged illness (certified by an attested physician)
- studying at a foreign university for one semester or longer
- a long internship which cannot be completed during the regular semester break (you will need a letter of approval by the faculty for this)
- formation of your own company (verified by an extract from the commercial register or a business plan approved by TUM)
- other reasons may be considered on a case-by-case basis

In particular, economic reasons or a long trip (biking or hiking around the world) are not viable reasons for a leave of absence.

A leave of absence is always granted for one whole semester (two semesters may be possible if you have a good reason) starting on the first day of the lecture period of the respective semester. For parental leave, a leave of absence of up to six semesters is possible. Your application has to be submitted before that day. To apply for a leave of absence, please consult with the Service Desk at the Student Service Center directly. See http://www.tum.de/en/studies/during-your-studies/leave-of-absence/ for more information, including contact data and opening hours of the Student Service Center.

Taking a leave of absence has a number of unfavourable consequences, so before taking a leave of absence, we recommend you consult with your respective academic advisor.

- You cannot take any examinations during a leave of absence. However, there are two exceptions to this rule: First, you may retake exams that you have already tried unsuccessfully before. Second, if your leave of absence is due to parental leave or to care for a close relative, you may take exams regularly (provided you register for them in time).
• You will not be able to register or submit a thesis during a leave of absence. In particular, if you are running late with your master’s thesis, taking a leave of absence is usually not an option.

• Deadlines for additional requirements and core modules are not affected. Thus, if you take a leave of absence while not having completed your additional requirements, you risk not being able to take the necessary examinations and being suspended.

• You will still have to pay student union fees.
Examination Regulations

Some Special Courses You Should Know About

Dr. Michael Ritter

Summer 2019

While the other learning stations give an overview of general rules and regulations, there are a few situations and courses where things work differently. This station is to help you get to know these courses.

1 Internship

Doing an internship is an integral part of your program. You will have to find an internship for yourself. A lot of companies in and around Munich have offered positions for our students in the past, but you are free to do your internship at some other city or even abroad. In addition, you will have to give a short talk on your internship and attend at least two other talks in the “internship seminar”. Listening to these talks is a good opportunity to gain some insight into possible career options and also to find companies for your own internship. Please remember to register for your talk in the internship seminar at least six weeks before lectures end, otherwise you might have to wait until the following semester to give your talk.

The content of the internship has to be relevant for your master’s program and it needs to have a duration of at least 4 weeks. There are a few formal requirements, for details please see https://www.ma.tum.de/de/studium/studienorganisation/Berufspraktikum.html. Students in the “Mathematics in Data Science” master’s program can attend the module “MA8113 TUM Data Innovation Lab” instead of doing an internship.

? Your Internship

- Have you already done an internship that you could use for your master’s program?
- When are you planning on doing your internship?

2 Interdisciplinary Modules

In addition to your mathematical courses, we require you to acquire some interdisplinary skills. The possibilities include language courses, presentation courses, self organization or modules from other faculties that are not related to your program. You need to collect at least 4 credit points (3 credit points for “Data Science”) from these modules, where language courses at an elementary level count at most 3 credits points. Grades for these modules do not count, but there has to be some form of assessment to certify you completed the module successfully. Here are a few possible choices:

- ProLehre: http://www.prolehre.tum.de/
- Language Center: http://www.sprachenzentrum.tum.de

https://www.ma.tum.de/de/studium/studienorganisation/pruefungen/ueberfachliche-grundlagen.html
• become a SET tutor
• UnternehmerTUM: https://www.unternehmertum.de
• https://www.ma.tum.de/de/studium/studienorganisation/pruefungen/ueberfachliche-grundlagen.html

In addition, students in the “Mathematics in Data Science” program have to complete 3 credit points worth of courses on “Social and Political Aspects of Data Science”, a catalog of possible courses is available on TUM-Online.

**Interdisciplinary Modules**

• Have you taken an interdisciplinary module that you could use for your master’s program already?
• Browse the course lists of CvL-Akademie and ProLehre. Which courses do you find interesting?

### 3 Seminars

The objective of seminars is twofold: First, you gain advanced knowledge on a mathematical topic working through current scientific journal papers. Second, you learn how to present that topic to an audience. In a seminar, you are usually assigned a topic and given some pointers to the literature. You are of course expected to do your own research on top of that and find other journal papers dealing with similar topics or applications thereof. You then select suitable parts that you want to present, devise a good structure to present these and prepare supporting materials like presentation slides, handouts or worksheets. As expectations for seminar talks may vary, it is of great importance to regularly consult with your advisor for the seminar.

A seminar does not give you any grade other than “pass” (or “fail”), but it is often the foundation for your thesis topic. If you plan on doing your thesis based on your seminar, be sure to talk to your advisor about that as early as possible so that she/he can take that into account when assigning topics.

Prior registration is required for participating in a seminar. During the last few weeks of each semester, a list of seminars for the coming semester is posted on [www.ma.tum.de](http://www.ma.tum.de). Registration then takes place online, the details will be posted on our website.

**Seminars**

In which semester do you plan to do your seminar? In which field?

### 4 Case Studies

The “Case Studies Discrete Optimization” and “Case Studies Nonlinear Optimization” provide hands-on experience for applying your mathematical skills to real-world challenges. In teams of 3-5 students, you work on a project for one semester and present your achievements at a workshop at the end of the semester. Units on soft skills such as presentation, poster design or project management are included in the courses. Both courses are offered during the summer term. A pre-meeting takes place at the end of the previous winter term. The number of participants is strictly limited, therefore registration is required for both “Case Studies” courses. The registration deadline is announced at the pre-meeting and is usually March 1st.

**Case Studies**

• hands-on problem solving
• teamwork, soft skills, mathematics
• registration mandatory
5 Your Master’s Thesis

The last major challenge during your program will probably be your master’s thesis. The topic is often based on a seminar you took, but you are free to ask any advisor that you would prefer. A thesis with an external partner (academia or industry) or with a different faculty is possible, provided you have an official advisor at the math department. Plan ahead and plan early if you consider something like this.

The thesis must be submitted 6 months after it has been officially registered and you remain enrolled at TUM from registration until submission of the thesis. In particular, you cannot take a leave of absence during that time (with the exception of a parental leave).

Please note that your thesis will have to submitted and graded while you are registered as a student at TUM — the examination will only be completed once the thesis is graded. So be sure to allow for enough time for your supervisor to study and properly assess your work.

? Your Thesis

• How many credits are awarded for a master’s thesis?
• How long does a thesis usually take?

6 Going Abroad

Do you want to go abroad and experience a different culture? Now is the time! TUM offers a number of exchange programs (ERASMUS, TUMexchange) with partner universities all across Europe and the world. For students of “Mathematics in Operations Research” we even offer double degree programs in cooperation with École Polytechnique in Paris and KTH Stockholm.

If you are interested, please be sure to plan early, most programs have strict application deadlines. If possible, you should go abroad during a winter term, as this makes it easier to coordinate different semester times for most universities. In any case, do contact our international office (Carola Jumpertz, Julia Cyllok) to get more information about your options and to get help with your applications. More information and contact data is available on https://www.ma.tum.de/de/internationales/internationales-uebersicht.html.