Study Guide
for the M.Sc. Business Mathematics

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1 Your Studies

1.1 Content and Structure

The modules in the M.Sc. Business Mathematics program are taught in English. You can freely choose among a wide variety of mathematics modules and one area of specialization for the economics part of your master program. Usually, your studies roughly follow the standard study plan (which you can find at the very end of this document).

A total of 120 ECTS credits have to be collected according to the following subcategories:

- 18-30 ECTS credits in mathematical optimization and stochastics
- 9-21 ECTS credits in further areas of mathematics
- 30 ECTS credits in one area of specialization in economics
- 30 ECTS credits for the master thesis
- 18 ECTS credits in computer science, general key qualifications (ASQ) and German

The areas of specialization in economics are:

- Innovation and Change
- Economics and Strategy
- Financial Risk
- Management Science
- Accounting, Taxation and Capital Markets
- Marketing Management

All courses in the areas “Innovation and Change” and “Economics and Strategy” are taught in English. The courses in the other four economics areas are mainly taught in German.

If you do not already have knowledge of German of at least an advanced CEFR level A2, then you have to follow an individual German language curriculum set up by the Language Center (see also Section 4). The aim is that you acquire a German proficiency of at least an advanced CEFR level A2. All the 18 ECTS credits required in the field computer science/ASQ/German can be collected by attending German classes.

If you do not choose “Innovation and Change” or “Economics and Strategy” as your area of specialization in economics, then you are required to take and pass the DSH2 examination, thereby ensuring that your knowledge of German is sufficient.

You can take modules totaling at most 18 ECTS credits that are part of the B.Sc. Business Mathematics program if you have not taken them during your bachelor studies.

A list of modules available for the M.Sc. Business Mathematics program you can find in the module catalogue.

1.2 Examinations and Grades

Except for Subsection 1.2.4 this section does not apply to the master thesis. Please see Section 2 for more information.
1.2 Examinations and Grades

1.2.1 General Information

In order to receive credit for taking a module you need to pass an examination. Here are some general things to keep in mind:

- You need to register for a module examination within 6 weeks after the beginning of the lecture period.
- An examination can be an oral or a written test, an oral presentation, writing a seminar paper or something else.
- After the examination you will receive a grade. Any grade better than or equal to 4.0 is a passing grade and earns you ECTS credits.
- Failing an examination (i.e. receiving the grade 5.0) for the first time automatically registers you for a re-examination. After failing this re-examination special rules apply (see Section 1.2.5).
- If you pass, your final grade is the grade you received on your last attempt. It is unaffected by previously failed attempts.

1.2.2 Registering for an Examination

You need to register for a module examination within 6 weeks after the beginning of a semester and you do this using Friedolin (see Section 4) via the link labeled “Apply for exams” after logging in. Within these 6 weeks you can withdraw from an examination via Friedolin without any problems.

Within 10 weeks of the beginning of the semester you can withdraw from an examination by handing in a request to the examination office providing adequate reasons for your withdrawal. However, it is impossible to withdraw from an examination after taking it, e.g. if you take an examination early in the semester (e.g. this can happen in a seminar).

If you cannot register for a module via Friedolin, then please check the module description to see if you fulfill its requirements. You can also register for modules that belong to the B.Sc. program as outlined in Section 1.1. For these modules you may need to make a request to the examination office. You should also consult the examination office if there are any other problems with the registration for modules.

1.2.3 Kinds of Examinations

There are different kinds of examinations, including the ones listed below. An examination can also be appropriately separated into multiple parts.

**Oral test**  In an oral test you may be asked to write down some definitions, proofs, etc. It is conducted by two examiners or an examiner together with an observer. In any case a record will be written. An oral test commonly takes between 20 and 60 minutes.

**Written test**  A written test may include mandatory questions only, but can also partially consist of obligatory chosen questions. Different kinds of questions are possible, including multiple choice questions. A written test commonly takes between 60 and 180 minutes. After the examination has been graded it is possible for you to review your test and appeal against the exam result, if this is justified.

**Oral presentation**  An oral presentation is usually, but not exclusively, required in seminars. It can incorporate different kinds of media, e.g. black boards, white boards and projectors. Make sure you are properly prepared for using a certain medium before giving your presentation. This includes bringing with you the necessary equipment and checking beforehand, whether everything works as desired. The duration of an oral presentation may vary, but is commonly between 30 and 90 minutes.
Writing a seminar paper When writing a seminar paper you are going to analyze and present a topic according to scientific standards within a specified time frame using established literature and possibly other sources, which need to be cited correctly.

1.2.4 Grades

This section also applies to the grade of your master thesis.

The examiner decides which grade you are going to receive based on your examination(s). The following integer grades are possible:

1 very good an outstanding result
2 good a result which heavily exceeds average results
3 satisfactory an average result
4 adequate a result which despite indicating a flawed performance is still adequate for passing the examination
5 failed a result representing a failed examination, i.e. not a passing grade

Other possible grades are integer grades $\pm 0.3$ excluding 0.7, 4.3, 4.7 and 5.3. For some modules there are only the possibilities of passing or not passing and no grade is given; therefore these modules are not considered when calculating your average grade. Additionally you will receive an ECTS grade according to the ECTS grading scale.

If you received multiple grades pertaining to a single module then the final grade will be their average, unless specified otherwise. In this case your grade will be rounded down after the first decimal place.

1.2.5 Repeating an Examination

Failing an examination Failing an examination for the first time automatically registers you for a re-examination. In case there are multiple partial examinations for the same module you are only required to repeat the failed ones; this counts as a single re-examination. The kind of re-examination may differ from the original examination. It may be impossible to repeat an examination without repeating the entire module. In this case this is specified in the module description.

An examination is considered failed if a passing grade is not achieved, if you do not take part in an examination you are registered for without properly withdrawing from it, and if you try to cheat or interfere with the examination.

Withdrawing from an examination You can ask to postpone an examination if exceptional circumstances hinder you to prepare or attend the examination. If you can not attend an exam because of physical or mental health problems, make sure to bring a doctor’s certificate. In any case the examination committee will decide about the further procedure.

Second re-examinations A second re-examination will be allowed for up to two modules upon request to the examination committee within one month after being informed about the failed re-examination. After two requests a second re-examination is only possible if a case of hardship occurred, which needs to be comprehensively justified. In any case a request for a second re-examination needs to specify all previous second re-examinations.

In the case of multiple partial examinations for the same module it counts as a single re-examination, if some of them are retaken.

If a second re-examinations is failed or not being allowed in the first place then a module is failed definitely and cannot be retaken.
2 Your Master thesis

2.1 General Information

With the master thesis you demonstrate that you are able to work independently on a mathematical topic, within a given time frame, and to present the results according to scientific standards.

Starting with your Master thesis The topic of the master thesis may be suggested by a lecturer or other habilitated staff members of your study program. The Examination committee can allow other supervisors. The topic can be changed once during the first two months of writing your thesis and the elapsed time will be refunded.

You can register for your master thesis, if you acquired at least 75 ECTS credits. This is done via a written request to the Examinations office, which specifies the desired topic and supervisor. After the Examination committee approves the registration, the topic of the thesis will be formally assigned. This usually takes no longer than two weeks.

It is possible to write a master thesis as a group if one can clearly evaluate the contribution of each group member to the master thesis. The evaluation of the contribution of a group member is unaffected by possible issues of the contributions of other members.

Finishing your master thesis You are allowed to work on your thesis no longer than six months reaching a total workload of 900 hours. Under reasonable circumstances the deadline may be extended up to three months via a request to the Examination committee. The request must contain a statement by your supervisor and has to be handed in up to four weeks before the deadline. Illness needs to be proved by a doctor’s certificate.

You need to hand in three printed copies of your thesis to the Examination committee and send an additional electronic copy (as a PDF file) to [studienamt_fmi(at)listserv.uni-jena.de].

Please use an 11pt or better 12pt font. You should also use borders of approximately 40mm on the left, 20mm on the right and 30mm on the top and bottom.

The printed copies need to be bound (do not use coil binding!) and in DIN A4 format. You can choose to use one- or two-sided printing.

It can be allowed to attach digital media to the printed copies using electronic storage media.

You must state in your thesis that you have written your thesis by yourself and that you have appropriately cited all sources used.

After handing in your master thesis Your master thesis will be independently reviewed and graded by your supervisor and an additional examiner chosen by the Examination committee. Under normal circumstances you will receive the average of the grades they determined.

In the exceptional case that their evaluations differ greatly, to ensure a fair grading, a third examiner will review your thesis once more and your final grade will be the median of all three grades.

Shortly before or after the completion of your thesis your advisor can ask you to give a talk presenting a summary of the results.

For more information on grades see the corresponding section.

2.2 Content and Structure

There are some general and important (yet rather obvious) things to keep in mind:

- It is discouraged to write an unnecessarily long thesis.
- The quality of your writing, i.e. your usage of language matters greatly.

The master thesis is supposed to consist of the components specified below. They each need to start on a new page. The components marked with an asterisk (*) need to have the specified heading.
1. Title page

2. Abstract  The abstract summarizes the content of the thesis in less then half a page and contains the main terms (keywords) used in the thesis.

3. Contents *  The table of contents includes all section headings and their corresponding numbers, as well as the titles of components 4, 6 and 7. It may be followed by an index of symbols or abbreviations.

4. Preface  The preface is not numbered and may be omitted. It discusses the reason for writing the thesis and how the results of the thesis influence the subject matter. It may also include acknowledgments.

5. Body  This is the main part of the thesis. The different levels of subsections are numbered using decimal numbers separated by dots (i.e. 2., 2.13., 2.13.1. etc.). Quoted content needs to be marked and cited in the bibliography or the foot notes. Annotations can be made in the foot notes or in an additional component directly after the body.

6. Bibliography *  You need to list all sources that were used in any way for writing your thesis in lexicographical order without making the individual items unnecessarily comprehensive. You can make individual sections for different kinds of literature, like monographs, journals etc.

   The body of your bibliography should look similar to the following example:


      Transliterations are used in place of Cyrillic writing (ask in the library).

7. Appendices *  The appendices can contain various additional content including tables, graphics, programs and software documentations. The content should be numbered accordingly.

8. Statutory Declaration  You must finish your master thesis with a statutory declaration:

   “I declare that I have developed and written the enclosed Master Thesis completely by myself and have not used sources or means without declaration in the text. Any thoughts from others or literal quotations are clearly marked. The Master Thesis was not used in the same or in a similar version to achieve an academic grading or is being published elsewhere.”

3 Completing the master program

After achieving 120 ECTS credits according to the rules specified in Section [Section], you have successfully completed the master program. You will receive a grade certificate usually within four weeks after the completion of your studies.

The grade certificate includes the topic of your master thesis, the name of all completed modules with the corresponding ECTS credits and grades (transcript of records).

In addition, you will receive a document (Master certificate) certifying that you are awarded the degree of a Master of Science. The Master certificate and transcript of records are issued in German and English. Moreover, you will obtain an EU diploma supplement in both languages.
4 Links

- **Friedolin** - the Campus Management System of the FSU Jena. It provides module descriptions and schedules of classes. You have to use it for registering for modules and examinations.

- **Language Center**
Standard Study Plan: MSc Business Mathematics

<table>
<thead>
<tr>
<th>Semesters</th>
<th>Mathematics</th>
<th>Economics</th>
<th>Computer Science, General key qualifications (ASQ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>30 CP</td>
<td>30 CP</td>
<td>42 CP</td>
</tr>
<tr>
<td></td>
<td>Master thesis</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>3 CP course</td>
<td>4 CP (at least 1 seminar)</td>
<td>A1.1/A1.2</td>
</tr>
<tr>
<td></td>
<td>2 CP course</td>
<td>18 CP (at least 1 seminar)</td>
<td>in Computer Science and ASQ</td>
</tr>
<tr>
<td></td>
<td>1 CP course</td>
<td>18 CP (at least 1 seminar)</td>
<td>in Economics</td>
</tr>
<tr>
<td></td>
<td>2 CP seminars</td>
<td>5 CP seminars</td>
<td>in Mathematics</td>
</tr>
<tr>
<td></td>
<td>2 CP seminars</td>
<td>6 CP seminars</td>
<td>in Optimization and Stochastics</td>
</tr>
<tr>
<td></td>
<td>3 CP seminars</td>
<td>6 CP seminars</td>
<td>in Other mathematical areas</td>
</tr>
<tr>
<td></td>
<td>6 CP seminars</td>
<td>6 CP seminars</td>
<td>in Economics</td>
</tr>
<tr>
<td></td>
<td>30 CP</td>
<td>30 CP</td>
<td>120</td>
</tr>
</tbody>
</table>

**Optimization and Stochastics:**
You have to collect at least 6 CP in Optimization and 6 CP in Stochastics.

**Other mathematical areas:**

**Economics:**
You have to collect 30 CP in one area of specialization in economics.

**Computer Science and General key qualifications (ASQ):**
Modules can be selected according to the study guide.

International students follow an individual study plan in agreement with the university language center with the aim to acquire German proficiency skills of at least CEFR level A2.