Curriculum and conditions – Bachelor Mathematics

Start of studies winter semester 2019/20 until winter semester 2022/23

Please note: the Bachelor's program Mathematics at TUM is a program in German. This curriculum plan only provides a brief overview of the program. Legally binding information can be found in the examination regulation.

Schematic Curriculum

Semester		Modules						Credits
1.		Analysis 1 9 CP	Linear Algebra 1 9 CP	Math. Basics 5 CP	Math. Studies 6 CP	Minor Subject 6 – 9 CP		30
2.	GOP	Analysis 2 9 CP	Lin. Alg. 2 and Discrete Math. 10 CP			Minor Subject 6 – 9 CP		30
3.		Analysis 3 9 CP	Numerics 9 CP	Introd. to Prob. and Statistics 9 CP		Intro. to Programming 3 CP		30
4.		Intro. to Optimization 9 CP	Algebra 9 CP	Geometry 9 CP 2 out of 3 modules	Professional Internship 6 CP	Minor Subject 6 – 9 CP		30
5.		Math. Specialization				Seminar 3 CP		30
6.		Math. Specialization		Interdisciplinary Courses 4 CP	Bachelor's Thesis 12 CP			30
Legend:		Grey: Compulsory modules in the basic area Light blue: Elective mathematical modules in the advanced and specialization areas Dark blue: Thesis, seminar and professional internship Light green: Modules in the minor subject area (elective and/or compulsory) Orange: Interdisciplinary courses (elective)						

Basic and orientation examination (GOP) and progress check

The GOP gives all students the opportunity to orient themselves on the basis of subject-specific content. By passing the exam, students also demonstrate that they have acquired the essential mathematical foundations that are a prerequisite for continuing their studies and an excellent indicator of academic success. This gives students clarity about the requirements of their degree course during their first year of study. Students who are unsuccessful in the GOP must leave the degree program.

The GOP comprises

- the four foundation modules (written): *Analysis 1*, *Linear Algebra 1*, *Analysis 2* and *Linear Algebra 2 and Discrete Mathematics* and
- the module *Mathematical Basics* (oral).

By the end of the second semester, at least two out of the four written foundation modules (*Analysis 1*, *Analysis 2, Linear Algebra 1*, *Linear Algebra 2 and Discrete Mathematics*) and the oral *Mathematical Basics* examination must have been passed. Students have two attempts for each of these. After this, students have an unlimited number of retakes for a maximum of two of the four written foundation modules.

In addition, the examination modules specified in the FPSO must be completed:
at least 30 credits by the end of the third semester,
at least 60 credits by the end of the fourth semester,
at least 90 credits by the end of the fifth semester,
at least 120 credits by the end of the sixth semester,
at least 150 credits by the end of the seventh semester and
at least 180 credits by the end of the eighth semester.

Elective area

The subject-related elective area is divided into a mathematical elective area with foundational modules and advanced modules as well as modules in the minor subject.

In addition, there is an interdisciplinary elective area with interdisciplinary courses.

The elective catalogs can be seen in TUMonline.

Foundation: At least two of the three foundational modules *Introduction to Optimization*, *Algebra* and *Geometry* must be completed.

Advanced: A large number of elective modules are available in the advanced area. In the Bachelor of Mathematics tracks, you will find a selection of possible modules that are suggested for the respective mathematical specialization. The Study Planner can also help you to plan your individual study plan.

Minor subject: A minor subject must be chosen during the degree course. The minor subjects Electrical Engineering and Information Technology, Computer Science, Physics and Economics can be studied without overlapping. For each minor subject, there is a specific catalog of elective (and in some cases compulsory) modules tailored to the Bachelor's degree in Mathematics.

Interdisciplinary courses: Students can round off their individual profile with elective modules that are not related to mathematics or the respective minor subject. These modules are included in the degree course as academic achievements and therefore have no influence on the final grade.

Credit requirements and degree

The following credit requirements must be fulfilled in the elective area:

<table>
<tr><th>Area</th><th colspan="3">Credit requirement</th></tr>
<tr><td>Foundational modules</td><td>at least 18 CP</td><td rowspan="2">at least 50 CP</td><td rowspan="3">in total
77 CP*</td></tr>
<tr><td>Advanced modules</td><td>at least 23 CP</td></tr>
<tr><td>Minor subject</td><td colspan="2">18 – 27 CP</td></tr>
<tr><td>Interdisciplinary courses</td><td colspan="3">4 CP</td></tr>
</table>

* Students with a minor in Computer Science who have not completed the module MA0010 *Introduction to Programming* must earn a total of 80 CP in the subject-related elective area.

All elective modules required to fulfill these conditions are fully included in the degree. A credit surplus is therefore possible in each section.

If more elective modules than required have been successfully completed, a selection of modules must be made which should be taken into account for the degree. All other modules are certified separately as additional achievements.

The final grade is calculated as the average grade of all graded modules weighted with the respective credits

- of the following three compulsory mathematical modules: *Analysis 3*, *Numerics*, *Introduction to Probability Theory and Statistics*,

- the subject-related elective area

- and the *Bachelor's Thesis*.

(These modules can be found in TUMonline in the section “Bachelor Exams”).

Only the first decimal of the mean value calculated in this way is taken into account for the final grade; all other decimal places are deleted without rounding.

GOP modules, ungraded elective modules and academic achievements are not included in the calculation, nor are additional achievements.