Master’s Program in Mathematics
Winter Semester 2019/20

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Technische Universität München
Overview

1. What’s New?
2. General Structure
3. Specialization vs Diversified Study
4. Requirements & Module Catalog
5. Modules from other Universities: Recognition
6. Comparison: Current vs New
7. Transition
What’s New?
What’s New?

- two options:
  - area of specialization
  - diversified study
- restructured module catalog
- catalog cleanup & update
Program Structure
General Structure

math modules

minor (opt)

thesis

seminar, internship, interdiscip. modules
General Structure

- Math modules: A1, A2, A3, A4, A5, A6
- Minor (opt): B1
- Seminar, internship, interdiscip. modules: C, D
- Thesis: E
## General Requirements

<table>
<thead>
<tr>
<th>Category</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math modules</td>
<td>≥ 50</td>
<td></td>
<td>77</td>
</tr>
<tr>
<td>Minor modules</td>
<td></td>
<td>≤ 27</td>
<td></td>
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<tr>
<td>Seminar</td>
<td></td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>Internship</td>
<td></td>
<td>6</td>
<td>13</td>
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<tr>
<td>Interdisciplinary modules</td>
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<td>4</td>
<td>13</td>
</tr>
<tr>
<td>Master’s thesis</td>
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<td>30</td>
<td>120</td>
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Specialization vs. Diversified Study

Option 1: Choose Area of Specialization

► will show up on transcript
► obtain $\geq 30$ credits from chosen section (A1-A6)
► obtain $\geq 50$ total math credits
► optional minor
Specialization vs. Diversified Study

Option 1: Choose Area of Specialization

▶ will show up on transcript
▶ obtain $\geq 30$ credits from chosen section (A1-A6)
▶ obtain $\geq 50$ total math credits
▶ optional minor

Option 2: Diversified Study

▶ obtain $\geq 9$ credits each in at least 4 sections
▶ admissible sections: A1-A6, B1, C
▶ obtain $\geq 50$ total math credits
▶ optional minor
Module Catalog
Mathematical Modules

A1  Analysis and PDE
A2  Algebra and Geometry
A3  Probability Theory
A4  Numerical Analysis and Scientific Computing
A5  Optimization
A6  Biomathematics and Biostatistics
B1  Mathematics Modules in other Fields
Module Catalog – Math Modules

A1  Analysis and PDE

- Functional Analysis
- Partial Differential Equations
- Dynamical Systems
- Fourier Analysis
- Differential Forms
- ...

...
Module Catalog – Math Modules

A2  Algebra and Geometry

- Algebra 2
- Algebraic Geometry
- Projective Geometry
- Differential Geometry
- Topology
- ...

Module Catalog – Math Modules

A3  Probability Theory

- Probability Theory
- Stochastic Analysis
- Markov Processes
- Probability on Graphs
- Probabilistic Techniques and Algorithms in Data Analysis
- ...

TUM
Module Catalog – Math Modules

A4  Numerical Analysis and Scientific Computing

- Numerical Methods for PDE
- Meshfree Methods
- Numerics of Dynamical Systems
- Computational Inverse Problems
- Optimal Control of ODE
- ...

TUM
Module Catalog – Math Modules

Optimization

- Linear and Convex Optimization
- Discrete Optimization
- Nonlinear Optimization Advanced
- Polyhedral Combinatorics
- Nonsmooth Optimization
- ...

A5
Module Catalog – Math Modules

A6  Biomathematics and Biostatistics

- Mathematical Models in Biology
- Applications of Mathematical Biology
  (formerly “Advanced Mathematical Biology”)
- Applied Regression
- Computational Statistics
- Case Studies Life Science Mathematics
- ...
Module Catalog – Math Modules

B1 Mathematics Modules in other Fields

- Generalized Linear Models
- Discrete Time Finance
- Investment Strategies
- Fixed Income Markets
- ...

...
Module Catalog – Minor Modules

Mathematical Theories in other Disciplines

- C1 Informatics
- C2 Physics
- C3 Economics
- C4 Chemistry
- C5 Life Sciences
- C6 Other Sciences
Going Abroad: Recognition
Recognition of Modules

1:1 Recognition

- (almost) identical to TUM module
- counts as TUM modules
- credits: minimum of the two modules
Recognition of Modules

1:1 Recognition

- (almost) identical to TUM module
- counts as TUM modules
- credits: minimum of the two modules

Mathematics Modules from other Universities (B2)

- master level course
- mathematical content
- recognized in math program
Recognition of Modules

Mathematical Theories in other Disciplines from other Universities (C7)

- master level course
- non-mathematical course
- application of mathematical theories
Recognition of Modules

Mathematical Theories in other Disciplines from other Universities (C7)

- master level course
- non-mathematical course
- application of mathematical theories

Recognition into Area of Specialization

- master level course
- suitable for the chosen field
- counts towards specialization credits
Comparison:
What has Changed?
Prominent Changes

- optional specialization
- restructured module catalog
- diversified study: cover 4 out of 8 sections (formerly 3 out of 5)
- new minor “Life Sciences”
- no explicit limits for module recognitions
Transition
Applicability of Examination Regulations

- from winter 2019/20 → new regulations
- until summer 2019 → old regulations
- change into new regulations: upon request → mail to master@ma.tum.de
- no changing back into old regulations
Questions?

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