

List of covered topics  
Application for Mathematics Master

Name

Surname

University

Application number

Please mark all topics which you have covered (or will cover) in during your complete studies, including the corresponding lecture title and the main reference book which was used in the course. If no main reference book was used, please indicate the name of the lecturer or similar information instead.

This list of topics is very long and we expect that applicants will not have covered most of them. Not knowing many of these topics is perfectly normal and not an indication that an applicant will be rejected. If you are not sure if you know enough about a topic to mark it, please just do. Basic knowledge is better than no knowledge.

Analysis	Corresponding lecture	Textbook (or lecturer)
<input type="checkbox"/> Lebesgue Integration		
<input type="checkbox"/> Riesz Representation Theorem		
<input type="checkbox"/> $L^p$ -spaces		
<input type="checkbox"/> Radon-Nikodym theorem		
<input type="checkbox"/> Fourier Analysis on Schwartz spaces		
<input type="checkbox"/> Cauchy Riemann equations		
<input type="checkbox"/> Residue Theorem		
<input type="checkbox"/> Topological vector spaces		
<input type="checkbox"/> Hilbert spaces		
<input type="checkbox"/> Banach spaces		
<input type="checkbox"/> Implicit function theorems in Hilbert or Banach spaces		
<input type="checkbox"/> Spectral theorem for compact operators		

Topology	Corresponding lecture	Textbook (or lecturer)
<input type="checkbox"/> Point-set topology		
<input type="checkbox"/> Fundamental group		
<input type="checkbox"/> Van Kampen theorem		
<input type="checkbox"/> Homotopy groups		
<input type="checkbox"/> (Co-)Homology of topological spaces		
<input type="checkbox"/> Mayer-Vietoris theorem		
<input type="checkbox"/> Coverings and Deck transformations		

Geometry	Corresponding lecture	Textbook (or lecturer)
<input type="checkbox"/> Topological and smooth manifolds		
<input type="checkbox"/> Stokes theorem		
<input type="checkbox"/> Tangent space and differential		
<input type="checkbox"/> Lie groups and Lie algebras		
<input type="checkbox"/> Topological groups		
<input type="checkbox"/> Haar measure		
<input type="checkbox"/> Curvature		
<input type="checkbox"/> Whitney embedding theorem		
<input type="checkbox"/> Curves and surfaces in $\mathbb{R}^3$		
<input type="checkbox"/> Immersed, embedded and regular submanifolds		
<input type="checkbox"/> Fixed point theorems (Banach, Brouwer)		
<input type="checkbox"/> Degree of a map		
Probability & Statistics	Corresponding lecture	Textbook (or lecturer)
<input type="checkbox"/> Measure-based probability		
<input type="checkbox"/> Convergence in distribution		
<input type="checkbox"/> Law of large numbers		
<input type="checkbox"/> Characteristic functions		
<input type="checkbox"/> Martingales		
<input type="checkbox"/> Stochastic processes in discrete time		
<input type="checkbox"/> Stochastic processes in continuous time		
<input type="checkbox"/> Large deviation principles		
<input type="checkbox"/> Estimator theory		
<input type="checkbox"/> Maximum likelihood estimators		
<input type="checkbox"/> Statistical tests		
<input type="checkbox"/> Neyman-Pearson lemma		
<input type="checkbox"/> Bayes statistics		

Numerical Analysis	Corresponding lecture	Textbook (or lecturer)
<input type="checkbox"/> Computer arithmetic		
<input type="checkbox"/> Linear systems of equations		
<input type="checkbox"/> Polynomial interpolation and approximation		
<input type="checkbox"/> Numerical integration		
<input type="checkbox"/> Numerical solution of nonlinear equations		
<input type="checkbox"/> Least squares problem		
<input type="checkbox"/> Numerical initial value problems		
<input type="checkbox"/> Structure-preserving integration		
Algebra	Corresponding lecture	Textbook (or lecturer)
<input type="checkbox"/> Abstract group theory		
<input type="checkbox"/> Sylow theorems		
<input type="checkbox"/> Abstract ring theory		
<input type="checkbox"/> Abstract field theory		
<input type="checkbox"/> Finite field extensions		
<input type="checkbox"/> Galois theory		
<input type="checkbox"/> Representation theory of finite groups		
<input type="checkbox"/> Hilbert's Nullstellensatz		
<input type="checkbox"/> Lie algebras		
Optimization & Computer Science	Corresponding lecture	Textbook (or lecturer)
<input type="checkbox"/> Linear programming		
<input type="checkbox"/> Dynamic programming		
<input type="checkbox"/> Convex optimization		
<input type="checkbox"/> Integer optimization		
<input type="checkbox"/> Combinatorial and/or network optimization		
<input type="checkbox"/> Approximation algorithms		
<input type="checkbox"/> Maximum flows and minimum cuts		
<input type="checkbox"/> Probabilistic algorithms		
<input type="checkbox"/> Complexity theory		

# Application for a Master's Degree Programme

**General Information**

Name Your application number  
 First Name Duration of degree (in years)  
 University  
 Title of (intended) degree  
 Credit System Number of credits required for graduation  
 Course Catalogue (URL)

**Grading scale for courses and papers**

Highest possible grade Minimum pass grade Lowest possible fail grade  
 Comments

**Record of Subjects Taken or to be Taken**

Please list all your classes, courses, theses, etc. in the same order as they appear on your official transcript. Please provide a short summary of the course descriptions (max. 479 characters).

No.	Acad Year	Subject					
Course Description and/or Textbook Used			Duration (Weeks)				
			Contact Hrs per Week				
			thereof	Lecture	Tutorial	Lab	Thesis
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