ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

D MATH

List of covered topics
Application for Mathematics Master

First Name		Last Name	
University		Application number	

Please mark[1] all topics which you have covered or will cover in your degree programme, including the corresponding lecture title and the main reference book which was used in the course. If no main reference book was used, please leave the field blank.

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
☐	Lebesgue integration		
☐	Riesz Representation theorem		
☐	L^p-spaces		
☐	Radon-Nikodym theorem		
☐	Fourier analysis on Schwartz spaces		
☐	Cauchy Riemann equations		
☐	Residue theorem		
☐	Topological vector spaces		
☐	Hilbert spaces		
☐	Banach spaces		
☐	Implicit function theorems in Hilbert or Banach spaces		
☐	Spectral theorem for compact operators		

	Topology	Corresponding lecture	Textbook
☐	Point-set topology		
☐	Fundamental group		
☐	Van Kampen theorem		
☐	Homotopy groups		
☐	Homology and cohomology of topological spaces		
☐	Mayer-Vietoris theorem		
☐	Coverings and Deck transformations		

[1] In case some of the checkboxes do not appear, try filling the form in a Chrome-based web browser.

	Geometry	Corresponding lecture	Textbook
☐	Topological and smooth manifolds		
☐	Stokes theorem		
☐	Tangent space and differential		
☐	Lie groups and Lie algebras		
☐	Topological groups		
☐	Haar measure		
☐	Curvature		
☐	Whitney embedding theorem		
☐	Curves and surfaces in R^3		
☐	Immersed, embedded and regular submanifolds		
☐	Fixed point theorems (Banach, Brouwer)		
☐	Degree of a map		

	Probability & Statistics	Corresponding lecture	Textbook
☐	Measure-based probability		
☐	Convergence in distribution		
☐	Law of large numbers		
☐	Characteristic functions		
☐	Martingales		
☐	Stochastic processes in discrete time		
☐	Stochastic processes in continuous time		
☐	Large deviation principles		
☐	Estimator Theory		
☐	Maximum likelihood estimators		
☐	Statistical tests		
☐	Neyman Pearson lemma		
☐	Bayes statistics		

Numerical Analysis		Corresponding lecture	Textbook
☐	Computer arithmetic		
☐	Linear systems of equations		
☐	Polynomial interpolation and approximation		
☐	Numerical integration		
☐	Numerical solution of nonlinear equations		
☐	Least squares problem		
☐	Numerical initial value problems		
☐	Structure-preserving integration		

Algebra		Corresponding lecture	Textbook
☐	Abstract group theory		
☐	Sylow theorems		
☐	Abstract ring theory		
☐	Abstract field theory		
☐	Finite fields		
☐	Galois theory		
☐	Representation theory of finite groups		
☐	Hilbert’s Nullstellensatz		
☐	Lie algebras		

Optimization & Computer Science		Corresponding lecture	Textbook
☐	Linear programming		
☐	Dynamic programming		
☐	Convex optimization		
☐	Integer optimization		
☐	Combinatorial and/or network optimization		
☐	Approximation algorithms		
☐	Maximum flows and minimum cuts		
☐	Probabilistic algorithms		
☐	Complexity theory		

General Information

Which Master's programme are you applying for? Please choose...

Your email address

Your application number

Name

First Name

University

Title of (intended) degree

Credit System

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. 489 characters).

No. | Acad Year | Subject

Course Description and/or Textbook Used

Duration (Weeks)

Contact Hrs per Week

thereof | Lecture | Tutorial | Lab | Thesis

Grade | Credits

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