ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Programme Regulations 2012

of the Master's degree programme in

Mathematics

Department of Mathematics

21 August 2012[1]

<mark>*This English translation is for information purposes only.*
The original German version is the legally binding version.</mark>

Articles

Version: **23.05.2023 – 5**

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[1] Version with changes pursuant to the Departmental Conference D-MATH resolution of 23.05.2023. This version of the Programme Regulations (23.05.2023 – 5) replaces the previous version (23.05.2017 – 4).

**Programme Regulations 2012 of the
Master's degree programme in Mathematics
Department of Mathematics**

21.08.2012 (Version: 23.05.2023)

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The ETH Zurich Executive Board,

pursuant to Art. 4, Para. 1 (a) of the ETH Zurich Organisational Ordinance (*Organisationsverordnung ETH Zürich*) of 16 December 2003[2],

decrees:

Chapter 1: General regulations

Part 1: General

Art. 1 Subject, Appendix

[1] These Programme Regulations set out the requirements according to which the following Master's degrees may be acquired at the ETH Zurich Department of Mathematics (D-MATH):

a. Master's degree in Mathematics

b. Master's degree in Applied Mathematics

[2] The Appendix is a part of these Programme Regulations. Any changes to the Appendix are subject to the approval of the Rector, on the request of or in consultation with D-MATH.

Art. 2 Academic titles

[1] Graduates of the ETH Zurich Master's degree programme in Mathematics (degree programme) are, depending on the specialisation chosen, awarded one of the following academic titles:

a. Master of Science ETH in Mathematik
(abbreviation: MSc ETH Mathematik)

b. Master of Science ETH in Angewandter Mathematik
(abbreviation: MSc ETH Angewandte Mathematik)

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[2] RSETHZ **201.021**

[2] The English forms of these titles are

a. Master of Science ETH in Mathematics
   (abbreviation: MSc ETH Mathematics)

b. Master of Science ETH in Applied Mathematics
   (abbreviation: MSc ETH Applied Mathematics)

[3] The title may also be used in the abbreviated form «MSc ETH».

Art. 3   Legal basis

These Programme Regulations are based upon the stipulations set out in the following legal documents:

a. General Ordinance on Course Units and Performance Assessments at ETH Zurich (*Leistungskontrollenverordnung ETH Zürich*) of 22 May 2012[3]

b. Ordinance on Admission to Studying at ETH Zurich (*Zulassungsverordnung ETH Zürich*) of 30 November 2010[4]

Art. 4   Course Catalogue

[1] D-MATH lists the course units of the degree programme for each semester in the Course Catalogue. This list is binding.

[2] Details regarding entries in the Course Catalogue are set out in the General Ordinance on Performance Assessments at ETH Zurich[5] and in the corresponding implementation stipulations of the Rector.

Art. 5[6]

Part 2:   Credit system

Art. 6   Policy

[1] The degree programme follows a credit system which is aligned with the European Credit Transfer System (ECTS).

[2] ETH Zurich deploys the ECTS in accordance with the Credit System Guidelines of the Rector (*Richtlinien zum Kreditsystem*)[7].

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[3] SR **414.135.1**, RSETHZ **322.021**
[4] SR **414.131.52**, RSETHZ **310.5**
[5] RSETHZ **322.021en** (in English)**,** SR **414.135.1** (in German)
[6] Rescinded (2014)
[7] See www.weisungen.ethz.ch (only in German)

Art. 7   Credits, basis for calculation

[1] Credits describe the average time expenditure required to achieve a learning goal.

[2] One credit corresponds to a workload of 30 hours. This workload comprises all of the study-related activities required to obtain said credit.

[3] The curriculum is designed such that full-time students may obtain an average of 30 credits per semester.

Art. 8   Allocation of credits to course units

[1] D-MATH allocates a certain number of credits to each of the course units it offers.

[2] If an ETH Zurich course unit is found on the curriculum of more than one ETH Zurich degree programme, the department offering the course unit assigns it a standard number of credits in consultation with those integrating it into a programme. The Rector settles any disagreements.

[3] If a course unit is offered by another university that university is responsible for allocating its credits.

Art. 9   Issuing of credits

[1] Credits are issued for satisfactory performance. Performance is considered satisfactory if it has been awarded a grade of at least a 4, or a «pass».

[2] No credits are issued for unsatisfactory performance.

[3] The full number of credits are always issued if the prerequisites of Para. 1 have been satisfied. Partial issue of credits is not permitted.

[4] The number of credits issued is that number published in the Course Catalogue valid at the time the respective performance assessment was undertaken.

Art. 10   Recording, checking, registration

D-MATH records, checks and registers the credits acquired.

Chapter 2: Content, scope and structure of the Master's degree programme

Part 1: Course offering, scope and structure

Art. 11 Course offering

[1] The Master's degree programme in Mathematics deepens the knowledge acquired in the ETH Zurich Bachelor's degree programme in Mathematics. It provides an opportunity for students to concentrate on one particular area among the many in mathematics and leads to the Master's degree in Mathematics or Applied Mathematics. The programme concludes with a Master's thesis in which students demonstrate that they are capable of independent work as mathematicians. The competences acquired in this programme enable graduates to independently apply and adapt mathematical models, recognise and investigate mathematical structures and – via the study of specialist literature – tap further areas of knowledge. Subject knowledge is complemented by freely-selected general electives from the humanities, social and political sciences. The Master's degree prepares students to enter the labour market or a doctoral programme.

[2] In addition to the specialisation in Applied Mathematics the Master's degree programme in Applied Mathematics includes courses in an applied area outside the field of mathematics, plus applied project work. With these elements the programme advances the ability to apply mathematical methods to non-mathematical disciplines.

Art. 12 Master's degree in Mathematics or Applied Mathematics

[1] Students of this degree programme can choose whether they wish to acquire a Master's degree in Mathematics or in Applied Mathematics. The decision must be taken by the time the degree request is submitted at the latest (see Art. 33 Para. 2). The number of credits required for the respective Master's degree is given in Art. 31 (Mathematics) and Art. 32 (Applied Mathematics).

[2] A student who is in the process of acquiring or has acquired one of these two Master's degrees may not count the performance achievements/credits recognised for said degree towards the other Master's degree.

[3] A student who wishes to acquire both Master's degrees must, after obtaining the first degree, re-matriculate in the Master's degree programme in Mathematics to earn the second degree.

Art. 12a[8] Direct Doctorate

[1] D-MATH offers a direct doctorate programme in Mathematics/Applied Mathematics.

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[8] Version pursuant to the decision of the Departmental Conference D-MATH of 07.03.2017, in force since 01.06.2017. Valid for students who commerce the degree programme in Autumn Semester 2018 or later.

[2] The provisions for Master's degree studies in the framework of the direct doctorate programme may diverge from the policy set out in these Programme Regulations.

[3] Details of the direct doctorate programme are provided in Appendix 2.

Art. 13   Programme procedures, Study Guide, programme advisory service

[1] Programme procedures are explained in the degree programme Study Guide.

[2] The D-MATH programme advisor helps students to design a curriculum.

Art. 14   Scope, duration, limits on duration of studies

[1] As stipulated in Art. 31 (Mathematics) and Art. 32 (Applied Mathematics), 90 credits are required to obtain the Master's degree.

[2] The normal duration of the degree programme is one and a half years.

[3] The maximum permitted duration of studies is three years. The Rector may extend this if cogent grounds are provided in a request submitted by the specific deadline.

[4] If admission to the degree programme is granted subject to the acquisition of additional credits the maximum permitted duration of studies may be extended by one semesters for required extra credits in the range of 21 – 30. For fewer than 21 required extra credits no extension is granted.

Art. 15   Language of instruction

Course units and the corresponding performance assessments are normally conducted in English. The language of instruction of ETH course units is also subject to the pertaining Rector's directives[9].

Art. 16   Admission to course units

Special admission prerequisites may apply to a course unit. If these are not specified in these Programme Regulations, they are specified by that ETH Zurich department or the university which offers the respective course unit.

Art. 17   Student exchange (outgoing students)

[1] During the Master's degree programme credits may be acquired at other universities (mobility credits). Of these a maximum of 30 may be counted towards the Master's degree. The stipulations of Para. 2 and 3 still apply.

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[9] See www.directives.ethz.ch

² Students who did not receive the preceding Bachelor's degree from ETH Zurich are subject to the following:

  a. They may not take part in ETH Zurich exchange programme.

  b. Individual exchange stays are possible, but no mobility credits may be applied towards the Master's degree.

³ If admission to the degree programme was granted subject to the acquisition of additional credits (admission with additional requirements) an exchange stay is only possible when the additional requirements have been completely fulfilled. Mobility credits may not be counted towards the fulfillment of additional requirements.

⁴ If course units from another university are part of the degree programme curriculum the credits earned thereby do not count as mobility credits.

⁵ For an exchange stay the student draws up a written study plan in advance with the help of the mobility advisor of D-MATH. This plan includes the credits to be acquired at the host university. It must be approved by the Director of Studies.

⁶ The Director of Studies decides whether mobility credits will be recognised. The ETH Zurich Ordinance on Performance Assessments[10] and the pertaining implementation stipulations of the Rector[11] set out how proof of academic achievement is handled.

⁷ Further details on exchange stays or recognition of credits are publicised appropriately, particularly on the degree programme website.

Part 2:   Categories

Art. 18   Grouping the courses offered by category

¹ To obtain a Master's degree study achievements are required in the following categories. The minimum number of credits required in each category is set out in Art. 31 (Mathematics) and Art. 32 (Applied Mathematics).

  a. Core courses and electives

    1. in areas of pure mathematics;

    2. in areas of applied mathematics and further applied areas;

  b. Application areas (only required for the MSc in Applied Mathematics);

  c. Seminars and semester papers;

  d. Science in Perspective;

  e. Master's thesis.

² D-MATH allocates course units to the categories and publishes them in the Course Catalogue.

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[10] RSETHZ **322.021en** (in English), SR **414.135.1** (in German)
[11] See www.directives.ethz.ch

Art. 19   Overview of categories

[1] **Core courses:** These provide a solid introduction to specific subject areas of pure or applied mathematics and other applied areas of e.g. physics or computer science. Students may make an individual selection. The core subjects are divided into two categories, one containing the core subjects of pure mathematics and the other mainly the core subjects of appled mathematics and other applied areas.

[2] **Electives:** Electives deepen knowledge in specific subject areas and may be selected individually by the student. They are divided into the same categories as the core courses. Further core courses may be taken instead of electives.

[3] **Application area**: This category is only required for the Master's degree in Applied Mathematics and includes courses from other ETH Zurich departments. These cover technological and scientific knowledge in areas significantly related to mathematics.

[4] **Seminars and semester papers:**
  a. In **seminars** students work on specific topics independently and deliver talks to other students. Seminars deepen knowledge in the general subject or in specialisations from specific areas and give students the opportunity to practice oral presentation skills. Students may make an individual selection.
  b. **Semester papers** deepen knowledge in a specific subject area; students may select from several themes. Semester papers foster students' ability to perform independent mathematical work and represent mathematical results in writing.

[5] **Science in Perspective:** Students are required to complete course units from the «Science in Perspective» programme. Details are set out in the pertaining directive[12].

[6] **Master's thesis:** The Master's thesis concludes the degree programme. In the Master's thesis project the student tackles a major mathematical task independently. This task usually combines study of the programme literature, the addressing of problems related to it and written presentation of the results.

Chapter 3:   Admission to the Master's degree programme

Art. 20   Prerequisites for admission

[1] Admission to the degree programme requires a university Bachelor's degree comprising at least 180 ECTS credits or an equivalent university degree in Mathematics or another qualifying discipline.

[2] Details of the academic and language prerequisites for admission (profile of requirements) are provided in the Appendix 1.

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[12] See www.directives.ethz.ch

Art. 21   Application / registration, admission procedure and entry to the
Master's degree programme

[1] Students of the Bachelor's degree programme in Mathematics already matriculated at ETH Zurich may enrol directly in the Master's degree programme.

[2] All other interested parties should apply to the ETH Zurich Admissions Office for admission to the degree programme.

[3] The admissions committee for Mathematics investigates candidates' academic backgrounds and suitability for the Master's degree programme. The chairperson of the admissions committee[13] formulates and submits to the Rector a request for admission/rejection.

[4] The Rector decides whether to admit/reject the candidate on the basis of the recommendation of the chairperson of the admissions committee.

[5] The Rector may, depending on the candidate's qualifications and previous knowledge, make admission conditional upon the acquisition of additional knowledge and competences during the Master's degree programme (admission with additional requirements).

[6] Details regarding enrolment or application, the admission procedure and entry to the Master's degree programme are determined by the Rector. They are set out in the Appendix 1.

Chapter 4:   Performance assessments

Part 1:   General regulations

Art. 22   Performance evaluation

Performance in examinations is graded. Performance in other forms of performance assessment is either graded or evaluated on a pass/fail basis.

Art. 23   Admission to performance assessments

Admission to performance assessments may be subject to conditions. If these are not specified in these Programme Regulations, they are specified by that ETH Zurich department or the university which offers the respective course unit.

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[13] The chairperson of the admissions committee must be an ETH Zurich professor.

Art. 24   Registering for / deregistering from performance assessments

[1] The following provisions apply to registration for / deregistration from performance assessments at ETH Zurich:

   a. If the performance assessments in question are end-of-semester examinations or session examinations, registration and deregistration are governed by the stipulations of the ETH Zurich Ordinance on Performance Assessments[14] and the associated implementation stipulations of the Rector[15].

   b. If the performance assessments fall into another category, registration and deregistration are generally handled by the respective lecturer in person.

[2] If the performance assessments concerned are those of another university, registration and deregistration are subject to the rules of the respective university.

Art. 25   Absence, interruption, breaking off, late submission or non-submission

The following stipulations apply to absence from, interruption or breaking off of, and late submission or non-submission of performance assessments:

   a. ETH Zurich performance assessments are governed by the stipulations of the ETH Zurich Ordinance on Performance Assessments[16] and the associated implementation stipulations of the Rector[17].

   b. Performance assessments of another university are subject to the rules of the respective university.

Art. 26   Issuing of results, disputes

[1] Students may view all of their performance results online via the corresponding ETH Zurich application. They are informed periodically by email as to which performance assessment results are now viewable.

[2] The procedure in cases of disagreement regarding newly documented results is outlined each time results are issued.

Art. 27   Improper conduct

The sanctions for improper conduct in the context of performance assessments are outlined in the Disciplinary Code of ETH Zurich (*Disziplinarverordnung ETH Zürich*) of 10 November 2020[18].

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[14] SR **414.135.1**, RSETHZ **322.021**
[15] See www.direcitves.ethz.ch
[16] SR **414.135.1**, RSETHZ **322.021**
[17] See www.directives.ethz.ch
[18] SR **414.138.1,** RSETHZ **361.1**

Part 2: Performance assessments in the Master's degree programme

Art. 28   Core courses, Electives, Application area, Science in Perspective

[1] Every course unit in the categories «Core courses», «Electives», «Application area» and «Science in Perspective» is subject to a performance assessment.

[2] The respective mode of each performance assessment is listed in the Course Catalogue if the course unit is offered by ETH Zurich.

[3] If a course unit is offered by another university that university determines the performance assessment mode of said course unit.

[4] A performance assessment is passed if it is awarded a grade of at least a 4 or a «pass».

[5] A failed performance assessment may be repeated once unless the ETH Zurich department or the university offering the respective course unit stipulates otherwise.

[6] The category «Application area» is also subject to the following stipulations:
  a. To obtain the Master's degree in Applied Mathematics one of the application areas listed must be selected.
  b. On request the Director of Studies may approve a further combination of courses from other departments as an application area.

Art. 29   Seminars and semester papers

[1] Every seminar is subject to a performance assessment. The respective mode of each performance assessment is listed in the Course Catalogue.

[2] The following stipulations apply to semester papers:
  a.[19] Semester papers are supervised by a professor or Senior Scientist from D-MATH. The D-MATH department conference may also authorise other instructors to supervise them (list of authorised persons). In individual cases the Director of Studies may on request give permission for instructors who are not on the list of authorised persons to supervise a semester paper. In the special case of the MSc programme in Applied Mathematics, if the paper addresses the selected applied area it may be co-supervised by an instructor from that applied area.
  b. The semester paper supervisor defines the task to be addressed and sets the paper's start date and deadline for submission.
  c. The semester paper concludes with a written report and in some cases also a talk.

[3] Seminars and semester papers are graded on a pass/fail basis.

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[19] Version pursuant to the decision of the Departmental Conference D-MATH of 09.12.2014, in force since 09.12.2014.

[4] A failed seminar or semester paper cannot be repeated. To obtain the missing credit's the student must attend a further seminar or write another semester paper and receive the corresponding «pass» grade.

Art. 30   Master's thesis

[1] A student is only permitted to commence the Master's thesis if

    a.   the Bachelor's degree programme has been completed;

    b.   any additional requirements for admission to the degree programme have been fulfilled.

[2] [20]The Master's thesis is supervised by a professor or Senior Scientist from D-MATH. The D-MATH department conference may also authorise other instructors to supervise them (list of authorised persons). In individual cases the Director of Studies may on request give permission for instructors who are not on the list of authorised persons to supervise a Master's thesis. In the special case of the MSc programme in Applied Mathematics, if the Master's thesis addresses the selected applied area it may be co-supervised by an instructor from that applied area.

[3] The Master's thesis project lasts five months. The Director of Studies may, on request, grant an extension if cogent grounds are given.

[4] The supervisor defines the task to be addressed in the Master's thesis and sets the start date and deadline for submission.

[5] The Master's thesis project concludes with a written report and in some cases also a talk.

[6] The Master's degree is graded. It is passed if the grade is at least a 4.

[7] A failed Master's thesis may only be repeated once. If it is repeated, a new topic must be addressed. A new supervisor may be chosen for the repetition.

Chapter 5:   Issuing of the Master's degree

Part 1:   Credits by category, and degree request

Art. 31   Master's degree in Mathematics

[1] The 90 credits required for the Master's degree must be acquired in the following categories in at least the numbers given. Further details are set out in Para. 2.

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[20] Version pursuant to the decision of the Departmental Conference D-MATH of 09.12.2014, in force since 09.12.2014.

a. [21]**Core courses and electives**	**38 credits**

at least 14 of the required 38 credits
must be acquired in core courses

b.	**Seminars and semester papers**	**8 credits**

at least 4 KP of the required 8 credits
must be acquired in seminars

c.	**Science in Perspective**	**2 credits**
d.	**Master's thesis**	**30 credits**

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	sum	*78 credits*

[2] The credits remaining to make up the 90 required must be earned in the categories «Core courses and electives» and/or «Seminars and semester papers».

Art. 32   Master's degree in Applied Mathematics

[1] The 90 credits required for the Master's degree in Applied Mathematics must be acquired in the following categories in at least the numbers given. Further details are set out in Para. 2 and 3.

a. [22]**Core courses and electives**	**26 credits**

1. Core courses   *(at least 14 of the required 26 credits*
must be acquired in core courses)
    − Core courses pure mathematics
    − Core courses applied mathematics
2. Electives
    − Electives pure mathematics
    − Electives applied mathematics

<u>Note</u>: *In the category «Core courses and electives» at least 14 of the required 26 credits must be acquired in «Core courses applied mathematics» or «Electives applied mathematics».*

b.	**Application area**	**8 credits**
c.	**Seminars and semester papers**	**12 credits**

− at least 8 of the required 12 credits
  must be acquired via semester papers
− at least one semester paper must address
  a topic relevant to the selected application area

d.	**Science in Perspective**	**2 credits**
e.	**Master's thesis**	**30 credits**

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	sum	*78 credits*

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[21] Version pursuant to the Department Conference resolution of 23.05.2023, in force since 01.06.2023.
[22] Version pursuant to the Department Conference resolution of 23.05.2023, in force since 01.06.2023.

[2] The credits remaining to make up the 90 required must be earned in one or more of the categories «Core courses and electives», «Application area» and «Seminars and semester papers».

[3] [23]In the category «Application area» (Para. 1 (b)) only credits stemming from the selected application area may be recognised. Credits from other application areas are listed on a separate sheet in the academic record if they cannot be recognised in another category (e.g. «Electives»).

Art. 33   Degree request

[1] When they have fulfilled the requirements set out in Art. 31 or Art. 32 students may request the issue of the Master's degree. The degree request must be submitted within three years of commencing the Master's degree programme. The Rector may extend this deadline if cogent grounds are provided by the respective request deadline.

[2] The request should contain the following:
   a.   the Master's degree desired (Mathematics or Applied Mathematics);
   b.   all the performance achievements with pass grades in the categories listed in Art. 31 or Art. 32 which are to be listed in the final academic record. In each category or sub-category the sum of the minimum number of credits set out in Art. 31 or Art. 32 must be acquired, plus missing credits up to the sum of 90.

[2bis] [24] Multipart core subjects and electives which are offered in both the Bachelor's and Master's degree programmes may only be recognised in their natural order. In particular, a Part 1 may not be recognised towards a Master's degree if the corresponding Part 2 has already been recognised towards the Bachelor's degree.

[3] A maximum of 100 credits may be recognised towards the Master's degree in the final academic record. All other study achievements are listed on a separate sheet of the academic record.

[4] A maximum of 30 mobility credits may be recognised towards the Master's degree. The stipulations of Art. 17 apply.

[5] The credits earned by completing a course unit may not be recognised more than once, or divided up.

[6] Students who request one of the two degrees from this Master's degree programme may not use the credits recognised towards it to request the other degree (see Art. 12).

[7] Recognition of study achievements or credits from preceding studies is not possible. Exceptions are listed in Para. 8.

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[23] Version pursuant to the Department Conference resolution of 23.05.2017, in force since 01.06.2017.
[24] Version pursuant to the Department Conference resolution, in force since 01.08.2015.

[8] Credits earned at ETH Zurich before taking up Master's degree studies may be recognised as long as the knowledge and skills acquired thereby are integral to the degree programme and the credits in question have not already been recognised towards a degree. The Director of Studies decides whether credits will be recognised. There is no automatic entitlement to recognition.

Part 2: Academic record, degree certificate and Diploma Supplement

Art. 34 Documents

Graduates of the degree programme receive three documents: an academic record, a degree certificate and a Diploma Supplement.

Art. 35 Academic record

[1] The academic record verifies the successful completion of the Master's degree.

[2] The academic record lists:
  a. The study achievements listed in the degree request as per Art. 33 Para. 2 (b), including grades and other measures of performance
  b. The final grade, computed as the weighted average of all the grades listed in the degree request, with the corresponding credits as weighting. Any grades in the category «Science in Perspective» are not taken into account in the final grade.

[3] A separate sheet of the academic record lists:
  a. Any additional admission requirements
  b. All further study achievements as set out in the pertaining implementation stipulations[25] of the Rector

[4] D-MATH records, checks and administers the grades and other measures of performance, and issues the academic records.

Art. 36 Degree certificate and Diploma Supplement

[1] Details regarding the degree certificate are set out the ETH Zurich Ordinance on Performance Assessments[26].

[2] The Diploma Supplement comprises a standardised explanation of the degree.

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[25] See www.directives.ethz.ch
[26] RSETHZ **322.021en** (in English), SR **414.135.1** (in German)

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Chapter 6: Final clauses

Art. 37 Definitive failure, exclusion from the degree programme

[1] The degree programme is regarded as definitively failed if one of the following applies:

a. The conditions for obtaining the Master's degree (acquisition of the required number of credits for the Master's degree according to the stipulations of Art. 31 or Art. 32, or any other conditions) can no longer be satisfied due to failure of performance assessments or failure to respect programme deadlines[27].

b. In cases of «admission with additional requirements» said additional requirements have not been fulfilled due to failure of performance assessments or failure to respect the deadlines set for them.

[2] Definitive failure results in exclusion from the degree programme.

Art. 38 Transcript of records after exclusion or abandonment of studies

Students who are excluded from the degree programme or withdraw from it before obtaining the Master's degree receive a transcript of records which lists all the study achievements generated and evaluated before exclusion or withdrawal.

Art. 39 Special cases

The Director of Studies rules on cases which are not or are not sufficiently addressed by these Programme Regulations, their Appendix, or other relevant ordinances and directives.

Art. 40 Entry into effect

[1] These Programme Regulations enter into effect at the beginning of Autumn Semester 2012.

[2] They apply to students who enter the degree programme from Autumn Semester 2012 onwards. This includes cases of re-entry to the degree programme from Autumn Semester 2012 onwards.

On behalf of the Executive Board

President: Ralph Eichler

General Secretary: Hugo Bretscher

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[27] «Programme deadlines» are deadlines for sitting a performance assessment, individual course deadlines, and the maximum permitted duration of studies.

Appendix 1

To the Programme Regulations 2012 of the
Master's degree programme in Mathematics

2 October 2018   (Version: 1 October 2021)

Applies to students who commence or re-enter the degree programme in Autumn Semester 2022 or later.

<mark>*This English translation is for information purposes only. The original German version is the legally binding version.*</mark>

Subject and scope

This appendix sets out the academic, language and performance prerequisites for and further details regarding admission to the Master's degree programme in Mathematics. It supplements the stipulations of the Admission Regulations of ETH Zurich and the Directive on Admission to Master's degree programmes.

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Contents

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1   Profile of requirements

Policy

For admission to the Master's degree programme in Mathematics (subsequently 'the degree programme') all of the following prerequisites must be satisfied.

1.1   Degree qualifications

[1] For admission to the degree programme one of the following is required:

a.   a university Bachelor's degree in Mathematics comprising at least 180 ECTS credits[1] or an equivalent university degree in Mathematics

b.   a university Bachelor's degree in a discipline other than Mathematics comprising at least 180 ECTS credits or an equivalent university degree which – also with the regard to any additional academic requirements within the given framework – satisfies the pertaining academic prerequisites.

[2] A Bachelor's degree qualifies its holder for admission to an ETH Master's degree programme only if it also qualifies said holder to enter, without additional requirements, the desired Master's degree programme within the university system where the Bachelor's degree was acquired. The Rector may also demand proof of this, determining whether such proof must come from the home university or from another university in the country where the Bachelor's degree was acquired.

1.2   Academic prerequisites

[1] Attendance of the Master's degree programme in Mathematics presupposes basic knowledge and skills in Mathematics which must in content, scope, quality and skill level be

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[1] ECTS: European Credit Transfer System. Credits describe the average time expended to achieve a learning goal. One credit corresponds to a workload of 30 hours

equivalent to those covered in the ETH Bachelor's degree programme in Mathematics (discipline requirements profile).

[2] The **discipline requirements profile** comprises **143 credits** in total and is based on knowledge and skills covered in the ETH Bachelor's degree programme in Mathematics, including the corresponding methodological scientific thinking skills. Details are set out in Para. 5 below.

[3] If an applicant does not completely satisfy the academic prerequisites, admission may be subject to the acquisition of the missing knowledge and skills in the form of additional requirements. Completion of additional requirements is expressed in credits. For further details, see Section 4 below.

[4] Admission to the degree programme is not possible if the academic gaps in the candidate's background are too extensive. For further details, see the Sections below.

[5] The **discipline requirements profile** is structured in the two parts set out below. Details regarding the content of the corresponding course units from the ETH Bachelor's degree programme in Mathematics are published in the ETH Course Catalogue (www.courses.ethz.ch).

Part 1: Basic knowledge and skills (83 credits)

Part 1 comprises 83 credits and covers basic knowledge and skills in Mathematics. The substance of the following course units is required:

– Analysis I and II (20 credits)

– Linear Algebra I and II (14 credits)

– Complex Analysis [Funktionentheorie] (6 credits)

– Algebra I and II (12 credits)

– Topology (6 credits)

– Measure and Integration [Mass und Integral] (6 credits)

– Probability and Statistics [Wahrscheinlichkeit und Statistik] (7 credits)

– Numerical Analysis I and II [Numerische Mathematik I und II] (12 credits)

Part 2: Subject-specific knowledge and skills (60 credits)

Part 2 comprises 60 credits and covers knowledge and competences in one or more of the disciplines Mathematics, Physics and Computer Science. Both pure and applied Mathematics should be represented. For example:

– Areas of <u>pure Mathematics</u> such as Algebra, Analysis and Geometry

– Areas of <u>applied Mathematics</u> such as Probability Theory, Statistics, Numerics, Theoretical Physics and Theoretical Computer Science

– <u>Physics</u> (e.g., the material taught in the Physics lectures on the curriculum of the ETH Zurich Bachelor's degree programme in Mathematics)

‒ <u>Computer Science</u> (e.g., the material taught in the «Computer Science» and «Algorithms and Complexity» courses of the ETH Zurich Bachelor's degree programme in Mathematics)

1.3 Language prerequisites

[1] The teaching language of the degree programme is English.

[2] For admission to the degree programme, proof of sufficient knowledge of English (Level C1)[2] must be provided.

[3] The required language certificates must be submitted by the application deadline. The ETH Zurich publishes a list of the language certificates accepted.

2 Specific stipulations for admission and entering the degree programme

2.1 Specific stipulations for admission to the degree programme

2.1.1 Candidates with a Bachelor's degree in Mathematics from ETH Zurich

Unconditional admission

The following persons are guaranteed unconditional admission to the degree programme:

  a. Holders of a Bachelor's degree in Mathematics from ETH Zurich
  b. Students enrolled in the ETH Bachelor's degree programme in Mathematics

2.1.2 Candidates with a Bachelor's degree in Mathematics from the University of Zurich

[1] A differentiation is made between the following types of Bachelor's degree in Mathematics at the University of Zurich (UZH):

  a. One-subject Bachelor's degree in Mathematics, with 180 credits in the subject of Mathematics (see Para. 2 below)
  b. Bachelor's degree with a major in Mathematics, with 150 credits in the subject of Mathematics (see Para. 3 below)
  c. Bachelor's degree with a major in Mathematics, with 120 credits in the subject of Mathematics (see Para. 4 below)

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[2] The required language level is measured according to the Common European Framework of Reference for Languages (CEFR) scale

[2] *Unconditional admission*

    a.   Unconditional admission to the degree programme is guaranteed for persons holding a one-subject Bachelor's degree in Mathematics from the University of Zurich with 180 credits in the subject of Mathematics.

    b.   Admission is subject to fulfilment of the language prerequisites set out in section 1.3 above.

[3] *Admission guaranteed*

    a.   Admission to the degree programme is guaranteed for persons holding a Bachelor's degree with a major in Mathematics from the University of Zurich with 150 credits in the subject of Mathematics.

    b.   Admission is subject to fulfilment of the language prerequisites set out in section 1.3 above.

    c.   Admission may be subject to additional requirements.

[4] *Admission not guaranteed*

Admission to the degree programme is *not* guaranteed for persons holding a Bachelor's degree with a major in Mathematics with 120 credits in the subject of Mathematics. This type of Bachelor's degree is subject to the stipulations set out in section 2.1.5 below.

2.1.3 Candidates with a Bachelor's degree in Mathematics from another Swiss university

[1] *Admission guaranteed*

    a.   Admission to the degree programme is guaranteed for persons holding a Bachelor's degree in Mathematics from a Swiss university (other than ETH Zurich and the University of Zurich) as long as this degree was a one-subject degree involving at least 150 credits in the subject of Mathematics.

    b.   Admission is subject to fulfilment of the language prerequisites set out in section 1.3 above.

    c.   Admission may be subject to additional requirements.

[2] *Admission not guaranteed*

Admission to the degree programme is *not* guaranteed for persons holding a Bachelor's degree from a Swiss university with a major in Mathematics with 120 credits or less in the subject of Mathematics. This type of Bachelor's degree is subject to the stipulations set out in section 2.1.5 below.

2.1.4 Candidates with a Bachelor's degree in Mathematics from a university outside Switzerland

[1] Holders of a Bachelor's degree or the equivalent in Mathematics from a university outside Switzerland must satisfy all of the academic and language prerequisites listed in Section 1.2 and 1.3 above for admission to the degree programme.

[2] Admission may be subject to additional requirements.

[3] Admission is not possible if any of the following apply

    a. the language prerequisites are not satisfied

    b. the content, scope, quality and skills level of the degree are not equivalent to those at ETH Zurich

    c. the number of additional credits required to satisfy the academic prerequisites (see Section 1.2) exceeds 30 credits in total

2.1.5 Candidates with a university Bachelor's degree in a discipline other than Mathematics

[1] Holders of a university Bachelor's degree or the equivalent in a discipline other than Mathematics may be admitted to the degree programme if they can satisfy all of the following prerequisites

    a. the academic requirements set out in Section 1.2 above are satisfied within the given framework

    b. the language prerequisites set out in Section 1.3 above are satisfied

    c. a very good academic performance during the Bachelor's degree studies

[2] Admission may be subject to additional requirements.

[3] Admission is not possible if any of the following apply

    a. the language or performance prerequisites are not satisfied

    b. the content, scope, quality and skills level of the degree are not equivalent to those at ETH Zurich

    c. the number of additional credits required to satisfy the academic prerequisites (see Section 1.2) exceeds 30 credits in total

2.2   Specific stipulations for entering the degree programme

2.2.1 Candidates with an ETH Bachelor's degree in Mathematics

Students of the ETH Zurich Bachelor's degree programme in Mathematics may enrol in the degree programme directly via *www.mystudies.ethz.ch*. The admission procedure outlined in Section 3 is waived. Further details:

a. The normal ETH enrolment dates and deadlines apply.

b. Enrolment is possible as soon as:

    1. only a maximum of 45 credits towards the Bachelor's degree are pending; and

    2. the first-year examinations and the compulsory second-year subjects of the Bachelor's degree programme have been passed

c. Admission is provisional until the Bachelor's degree is issued. Admission will be revoked if the Bachelor's degree is not or cannot be issued.

2.2.2 Candidates with an ETH Bachelor's degree in a discipline other than Mathematics

The following stipulations regarding entry to the Master's degree programme apply to students from an ETH Zurich Bachelor's degree programme (other than Mathematics) who have been granted admission:

a. The normal ETH enrolment dates and deadlines apply.

b. They can enrol in the programme once they have acquired that number of credits which would qualify them to enrol in the Master's degree programme consecutive to their original subject.[3]

c. Admission is provisional until the Bachelor's degree is issued. Admission will be revoked if the Bachelor's degree is not or cannot be issued.

2.2.3 Candidates with a Bachelor's degree from another university

Non-ETH graduates who have been granted admission may only begin the degree programme when they have completed the previous (Bachelor's) degree programme.

3   Application and admission procedure

[1] All candidates – with the exception of matriculated ETH Zurich students from the Bachelor's degree programme in Mathematics – must submit an application for admission to the degree programme. The binding specifications for application, in particular the documents required and the submission dates/deadlines, are published on the website of the ETH Zurich Admissions Office (www.admission.ethz.ch).

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[3] The permitted number of missing credits is set out in the Programme Regulations of the respective consecutive Master's degree programme (e.g., BSc Physics → MSc Physics).

[2] Application may be made even if the required preceding degree has not yet been issued.

[3] Applications will not be considered if

   a. they are submitted late or not in the correct form, *or*

   b. the relevant fees have not been paid.

[4] The admissions committee of the degree programme determines how far the background of the candidate corresponds to the profile of requirements. The Chair of the admissions committee[4] formulates and submits an application for admission/rejection to the Rector.

[5] On the request of the Chair of the admissions committee the Rector makes the final decision regarding admission or rejection.

[6] The candidate receives a written admissions decision which includes relevant information concerning any additional admission requirements.

4   Fulfilling additional admission requirements

4.1   General regulations

[1] Candidates who are admitted subject to the fulfilment of additional requirements must acquire the required additional knowledge and skills before or during the Master's degree programme via self-study or by attending classes. The corresponding individual performance assessments must take place by set deadlines.

[2] If the candidate fails said performance assessments or does not respect the set deadlines she/he will be regarded as having failed the programme and will be excluded from it.

[3] The deadlines and conditions for undergoing said performance assessments are set out in Section 4.2 below.

4.2   Performance assessment deadlines and conditions

[1] Candidates must undertake all of the performance assessments pertaining to the additional admission requirements by the end of the first year of the Master's degree programme at the latest. All additional requirements, including any assessment repetitions, must be fulfilled within 18 months of the start of the Master's degree programme at the latest.

[2] A pass grade in each individual performance assessment is required.

[3] A failed performance assessment may only be repeated once.

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[4] The Chair of the admissions committee must be an ETH Zurich professor.

Appendix 2

To the Programme Regulations 2012 of the
Master's degree programme in Mathematics

07.03.2017   (Version: 01.01.2022)

Applies to students who commence the direct doctorate programme in Autumn Semester 2018 or later.

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<mark>*This English translation is for information purposes only. The original German version is the legally binding document.*</mark>

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Direct doctorate programme

(Ref.: Art. 12a of the Programme Regulations)

Art. 1   Subject and scope

This appendix sets out the policies which govern the direct doctorate programme in Mathematics/Applied Mathematics (direct doctorate programme) at the ETH Zurich department of Mathematics (D-MATH).

Art. 2   Objective

The direct doctorate programme enables candidates with an outstanding university Bachelor's degree to commence doctoral studies directly.

Art. 3   General

The modalities of the direct doctorate programme are based upon the Rector's Directive on the direct doctorate programme of 1 November 2016[1] and further relevant ETH Zurich enactments: the Ordinance on Doctoral Studies ETH Zurich of 23 November 2021[2], the ETH Zurich Admissions Ordinance of 30 November 2010[3] and the ETH Zurich Ordinance on Performance Assessments of 22 May 2012[4].

Art. 4   Components of the direct doctorate programme

The direct doctorate programme is composed of two parts. The first comprises a complete Master's degree programme in Mathematics/Applied Mathematics according to Art. 8 of this appendix, and the second actual doctoral studies.

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[1] See www.directives.ethz.ch
[2] RSETHZ **340.31en**, (SR **414.133.1**)
[3] SR **414.131.52**, RSETHZ **310.5**
[4] SR **414.135.1**, RSETHZ **322.021**

Art. 5   Application

[1] Holders of a Bachelor's degree from ETH Zurich or another university or a degree recognised by ETH Zurich as equivalent which demonstrates outstanding academic performance may apply for admission to the direct doctorate programme. The respective degree must be in one of the disciplines which qualify the holder to pursue the Master's degree programme in Mathematics/Applied Mathematics.

[2] Application for the direct doctorate programme is always associated with the D-MATH Master's degree programme in Mathematics/Applied Mathematics. Application proceeds online via the application portal for Master's degree studies.

[3] Application for the direct doctorate programme is also subject to the following:

  a. The same binding stipulations which govern application for the Master's degree programme in Mathematics/Applied Mathematics also apply to the direct doctorate programme, particularly those regarding dates, deadlines and documents to be submitted.

  b. Application may proceed even if the required Bachelor's degree has not yet been issued. Entry to the direct doctorate programme may not proceed, however, until Bachelor's degree studies have been completed.

Art. 6   Admission

[1] Admission to the direct doctorate programme is only possible if all of the following conditions are met:

  a. Official proof of qualifications as per Art. 7, Para. 2 (d) of the Ordinance on Doctoral Studies ETH Zurich[5] have been supplied, with the proviso that the direct doctorate programme includes a Master's degree programme in Mathematics/Applied Mathematics according to the provisions of Art. 8 of this appendix.

  b. All of the admission prerequisites of the D-MATH Master's degree programme in Mathematics/Applied Mathematics have been met and allow admission to the Master's degree programme in Mathematics/Applied Mathematics with no additional requirements. The appraisal of applications is conducted according to the normal procedure through the Academic Services Admissions Office and the admissions committee of the Master's degree programme in Mathematics/Applied Mathematics.

  c. The doctoral committee of D-MATH endorses any admissions to the direct doctorate programme.

  d. The written agreement of D-MATH professors has been submitted and fulfils the following criteria:

    1. One professor assumes responsibility for supervising both the Master's thesis and the doctoral thesis.

    2. A further professor also agrees to support the student pursuing the direct doctorate.

    3. At least one of the two professors mentioned in (1.) and (2.) must be a full or associate professor.

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[5] RSETHZ **340.31en**, (SR **414.133.1**)

[2] If the admission requirements of (1) are fulfilled, D-MATH submits a request for admission to the direct doctorate programme to the Rector (represented by the Vice-Rector for Doctoral Studies).

[3] Admission to the direct doctorate programme comprises:

a. Admission to the Master's degree programme in Mathematics/Applied Mathematics with no additional requirements

b. Provisional admission to doctoral studies as per Art. 9 of the Ordinance on Doctoral Studies ETH Zurich[6]

[4] Completion of the Master's degree programme in Mathematics/Applied Mathematics according to the provisions of Art. 8 of this appendix replaces the additional admission requirements described in Art. 59 of the Ordinance on Doctoral Studies ETH Zurich[7].

Art. 7   Matriculation

Students pursuing the direct doctorate programme have two matriculations at ETH Zurich: they are matriculated as both Master's degree and doctoral students. The Master's degree matriculation ends when the Master's degree programme is completed.

Art. 8   Master's degree programme

[1] Students in the direct doctorate programme complete the D-MATH Master's degree programme in Mathematics/Applied Mathematics and acquire the Master's degree in Mathematics or Applied Mathematics.

[2] To complete the Master's degree in Mathematics or Applied Mathematics in the framework of the direct doctorate programme, students must

a. adhere to the stipulations of the Programme Regulations 2012 of the Master's degree programme in Mathematics/Applied Mathematics[8];

b. fulfil the following additional requirement, which diverges from the policy set out in the 2012 Programme Regulations: the study achievements required to obtain the Master's degree – with the exception of the Master's thesis – must be acquired within three semesters of commencing studies.

[3] On request the doctoral committee may, in place of the Master's thesis, recognise a research project of equivalent scope which concludes with a scientific publication.

[4] D-MATH is responsible for checking adherence to the requirements set out in Para. 2 above.

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[6] RSETHZ **340.31en**, (SR **414.133.1**)
[7] RSETHZ **340.31en**, (SR **414.133.1**)
[8] RSETHZ **324.1.0900.11**

Art. 9   Degree request

[1] Students must submit the degree request as soon as they have fulfilled all the academic requirements for the Master's degree as listed in Art. 8 of this appendix.

[2] Completion of the Master's degree programme is verified with the usual documents (academic record, degree certificate and Diploma Supplement).

Art. 10   Definitive admission to doctoral studies

Definitive admission to doctoral studies proceeds when all of the following apply:

a.   Master's degree studies have been completed.

b.   The additional requirements according to Art. 8, Para. 2 (b) of this appendix have been fulfilled.

c.   All further admission requirements as per Art. 17 of the Ordinance on Doctoral Studies ETH Zurich[9] have been fulfilled.

Art. 11   Maximum permitted duration of doctoral studies

[1] The doctoral examination must be undertaken six years after admission to the direct doctorate programme or provisional admission to doctoral studies at the latest. Students in the direct doctorate programme may, pursuant to Art. 39, Para. 3 of the Ordinance on Doctoral Studies ETH Zurich[10], extend this deadline by one year.

[2] Despite the right to this one-off extension it is not automatic, but requires a request.

Art. 12   Exclusion from the direct doctorate programme

[1] Exclusion from the direct doctorate programme proceeds in the following cases:

a.   The requirements for obtaining the Master's degree in Mathematics or Applied Mathematics (required number of credits, any other requirements) can no longer be fulfilled.

b.   The additional requirements as per Art. 8, Para. 2 (b) of this appendix can no longer be fulfilled.

[2] Exclusion as mentioned in Para. 1 (a) constitutes simultaneous exclusion from the Master's degree programme in Mathematics/Applied Mathematics, because the latter counts as definitively failed.

[3] The Master's degree programme in Mathematics/Applied Mathematics may be continued after exclusion according to Para. 1 (b). The additional requirements as per Art. 8, Para. 2 (b) of this appendix are then no longer relevant to acquiring the Master's degree. Renewed application for doctoral studies is possible after successful completion of Master's degree studies.

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[9] RSETHZ **340.31en**, (SR **414.133.1**)
[10] RSETHZ **340.31en**, (SR **414.133.1**)

[4] The provisions of Art. 20, 21 and 22 of the Ordinance on Doctoral Studies ETH Zurich[11] also apply.

Art. 13   Withdrawal of agreement to supervise the doctoral thesis

If the professor withdraws her/his agreement to supervise the doctoral thesis, the provisions of Art. 30, 33 und 49 – 51 of the Ordinance on Doctoral Studies ETH Zurich[12] apply.

Art. 14   Funding, tuition fees waiver, appointment at D-MATH, and
                doctoral studies fees

[1] Students in the direct doctorate programme receive a merit-based scholarship for the duration of the Master's degree programme. The respective amount corresponds to the funds required of foreign students by the Migration Office of the Canton of Zurich to cover tuition and living costs.

[2] The professor mentioned in Art. 6, Para. 1 (d) (1) of this appendix is responsible for funding the merit-based scholarship. Further department members and the department itself may also contribute. The scholarship is paid out each semester via the D-MATH.

[3] Students in the direct doctorate programme are not subject to tuition fees for the duration of the Master's degree programme.

[4] Students may work as Teaching Assistants (Hilfsassistentin/Hilfsassistent*)* while drawing the merit-based scholarship.

[5] Exclusion from the direct doctorate programme means loss of the merit-based scholarship and cessation of the tuition fees waiver.

[6] After Master's studies are completed the student is employed as a doctoral student according to the conditions usual in D-MATH.

[7] Doctoral fees as per Art. 6 of the Ordinance on Doctoral Studies ETH Zurich[13] cannot be waived.

[8] Any deviations from the stipulations in Para. 1 and 2 are subject to the Rector's approval.

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[11] RSETHZ **340.31en**, (SR **414.133.1**)
[12] RSETHZ **340.31en**, (SR **414.133.1**)
[13] RSETHZ **340.31en**, (SR **414.133.1**)