Semester Papers, Seminars, Collaborations

for the Math BSc at ETH Zurich

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26. November 2025

Mathematical Writing, ETH Zürich

   I. Fulfilling regulations for Math BSc at ETH Zurich
                    regarding **seminars and semester papers**

  II. Finding Math BSc or MSc project opportunities

 III. Collaborating

I. Fulfilling Regulations

Old study regulations for Math BSc

– BSc thesis (8 credits)   *Bachelorarbeit*

– Seminars (at least 4 credits)   *Seminare*

New regulations   *Studienreglement 2024*

– Seminars & Semester Papers (at least 4 credits,

from which at least 2 credits for seminars)

Seminare und Semesterarbeiten

4 credits per seminar

☞ See regulations (in German). *Excerpts follow.*

- *In den **Seminaren** wird von jeder Teilnehmerin/jedem Teilnehmer ein bestimmter Stoff selbständig erarbeitet und den anderen Teilnehmenden vermittelt. Seminare dienen der Erweiterung des Grundlagenwissens oder der Vertiefung in spezifischen Fachbereichen sowie der Förderung überfachlicher Kompetenzen. Die Themen werden den Studierenden zur individuellen Auswahl angeboten.*

- ***Semesterarbeiten** dienen der Vertiefung in einem spezifischen Fachbereich. Sie sollen die Fähigkeit der Studierenden zu selbständiger mathematischer Tätigkeit und zur schriftlichen Darstellung mathematischer Ergebnisse fördern. Die Themen werden den Studierenden zur individuellen Auswahl angeboten.*
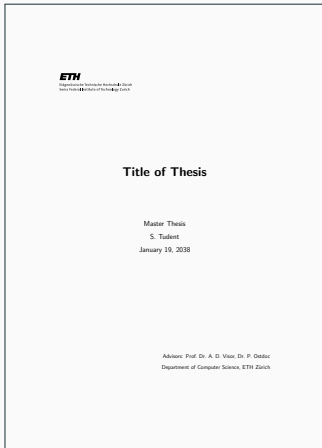
Regulations: performance assessment for semester papers

- *Semesterarbeiten stehen unter der Leitung einer Professorin/eines Professors des D-MATH oder einer/eines Senior Scientist des D-MATH. Die Departementskonferenz des D-MATH kann weiteren Dozierenden die Berechtigung erteilen, Semesterarbeiten zu leiten (Berechtigungsliste). Die Studiendirektorin/der Studiendirektor kann in Einzelfällen auf begründetes Gesuch hin Dozierenden, die nicht in der Berechtigungsliste aufgeführt sind, die Berechtigung erteilen, eine Semesterarbeit zu leiten.*
- *Die Leiterin/der Leiter der Semesterarbeit definiert die Aufgabenstellung und legt die Termine für den Beginn und die Abgabe der Arbeit fest.*
- *Semesterarbeiten werden mit einem schriftlichen Bericht oder einem Vortrag abgeschlossen.*
- *Eine Semesterarbeit ist bestanden, wenn die Leistung mit dem Prädikat "bestanden" bewertet wird.*
- *Eine nicht bestandene Semesterarbeit kann nicht wiederholt werden. Für den Erwerb der erforderlichen KP muss eine weitere Semesterarbeit verfasst werden.*

For writing a semester paper or a BSc/MSc thesis

- **Find an advisor** $\longrightarrow$ see next section

- **Other ETH practicalities:** $\longrightarrow$ see next pages

  1. Template for semester papers (optional)
  2. Declaration of originality (compulsory)
  3. Guidelines on scientific integrity (compulsory)
  4. English style guide (optional)

1. Template for semester papers

ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zürich

Title of Thesis

Master Thesis
S. Tudent
January 19, 2038

Advisors: Prof. Dr. A. D. Visor, Dr. P. Ostdoc
Department of Computer Science, ETH Zürich

- Popular <u>thesis template</u> also available <u>on Overleaf</u> provided by CADMO

  ☞ Use a standard template; do not try to stand out!

  ☞ Find other ETH templates by searching for "ETH" in the <u>Overleaf templates</u>.

- CADMO also provides <u>LaTeX</u> and <u>other advice</u>

- At the end of your paper, you have to attach the <u>declaration of originality</u>

CADMO = Center for Algorithms, Discrete Mathematics and Optimization

ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Declaration of originality

The signed declaration of originality is a component of every written paper or thesis authored during the course of studies. **In consultation with the supervisor**, one of the following two options must be selected:

☐   I hereby declare that I authored the work in question independently, i.e. that no one helped me to author it. Suggestions from the supervisor regarding language and content are excepted. I used no generative artificial intelligence technologies[1].

☐   I hereby declare that I authored the work in question independently. In doing so I only used the authorised aids, which included suggestions from the supervisor regarding language and content and generative artificial intelligence technologies. The use of the latter and the respective source declarations proceeded in consultation with the supervisor.

Title of paper or thesis:

Authored by:
If the work was compiled in a group, the names of all authors are required.

Last name(s):   **First name(s):**

.../...

Check for the most recent form.

3. Guidelines on scientific integrity

See part 1 of <u>Lecture 4</u> regarding

why, what and how to cite in Mathematics.

See <u>Citation Guidelines</u> (ETH Library 2025) when

directly quoting, paraphrasing, or summarizing other works.

See <u>Scientific Integrity Guidelines</u> (ETH 2025):

Plagiarism, ghostwriting, and the unauthorised, undeclared use of generative artificial intelligence technology constitute deception of the readership with regard to the origin of the text and may invoke disciplinary proceedings as per the ETH Zurich Ordinance on Disciplinary Measures of 10 November 2020.

4. English style guide

☞ Stay consistent in your language choices

- British English   or   American English?

  "analyse a neighbourhood"   *"analyze a neighborhood"*

- European style dates   *"26.11.2025" or "26 November 2025"*

- Decimals separated by stop signs,
  thousands separated by spaces   *"1 000.75"*

- Capitalization

  Capitalize all words in the paper title except articles, prepositions, and conjunctions. Use sentence-like capitalization for section headings.

- Comma rules   *see reference given by TAs*

- Typography   *quotation marks ("..."), hyphens (-) vs. dashes (–)*

English vs. German

> Math BSc theses and semester papers can be **in English or in German**. Lately, the vast majority are in English. Math MSc theses should be in English.

If you write in English, keep in mind:

- ☞ **English prefers simple sentences.**

- ☞ A **simple tense** suits most math statements. Example:

NOW: We **prove** the result by induction.

FUTURE: Below, we **prove** the result by induction.

PAST: Above, we **proved** the result by induction.

from Will Merry's *Communication in Mathematics* (ETH 2020)

Math false friends

<table>
<tr><td>English</td><td></td><td>*German*</td></tr>
</table>

~~It holds (that) …~~	We have …	*Es gilt …*
('Equation (5) holds.' is fine, though.)		
~~x fulfills property $\mathcal{P}$.~~	x satisfies property $\mathcal{P}$.	*x erfüllt Eigenschaft $\mathcal{P}$.*
~~in average~~	on average	*im Durchschnitt*
~~estimation~~	estimate	*Abschätzung*
~~composed number~~	composite number	*zusammengesetzte Zahl*
~~with the help of~~	using	*mit Hilfe von*
~~surely~~	clearly	*sicher, bestimmt*
~~monotonously increasing~~	monotonically/monotone incr.	*monoton steigend*
(Actually, in most cases 'increasing' is just fine.)		

from CADMO's Rules for Writing in English (2012)

General false friends (1)

GERMAN	ENGLISH, RIGHT AND WRONG; WITH GERMAN EQUIVALENTS FOR ENGLISH "FALSE FRIENDS"
aktuell	current ≠ actual (tatsächlich)
Amok/Amokläufer	attacker, school/campus shooter ≠ amok "Amok" does not exist in English in this sense. To "run amok" can indicate violence, but usually of an angry mob.
eventuell	possibly, potentially ≠ eventually (irgendwann, schliesslich)
Billion	trillion (1,000,000,000,000) ≠ billion (Milliarde: 1,000,000,000)
bis	until, by Hop up and down **until** I say stop. Applications must be received **by** Friday, 13 November. These are two separate meanings that each require the correct word.
Engagement/engagiert	commitment/committed, involvement/involved, dedication/dedicated ≠ engagement/engaged (Verlobung, besetzt [toilet, telephone line])
familiär	(relating to) family ≠ familiar (vertraut, bekannt)
Fotoshooting	photo shoot ≠ photo shooting A "shooting" in English almost always involves a gun, although you will see "photo-shooting tips" and similar uses as part of an adjective.
Fraktion	faction, political party or group ≠ fraction (Bruchteil)

from English style guide (ETH 2015)

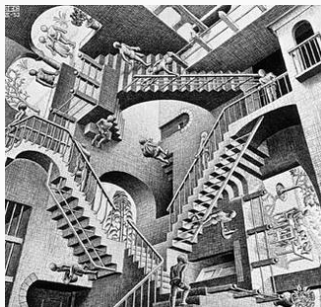|	
ggf.	possibly, if necessary/applicable/appropriate no equivalent abbreviation in English
Gymnasium	secondary school (UK), high school (US) ≠ gymnasium (Turnhalle)
Handy	mobile (phone) (UK), cell (phone) (US) ≠ handy (praktisch)
Hochschule	college/university (tertiary level institution) ≠ high school (secondary level = Gymnasium)
Know-How	expertise, skills ≠ know-how This is a subtle distinction. In English, "know-how" has a much more practical bent and is generally used to describe hands-on skills and <u>practical knowledge</u> rather than technical expertise.
Kompetenz, kompetent	expertise, excellence (or institutional authority); (highly) skilled, expert ≠ competence, competent Although "competence" or "competency" can take on different shades of meaning in different contexts, in ordinary English it is essentially a mistranslation of *Kompetenz*. To be "competent" in English is nothing special and often suggests there is nothing better to be said about your skills. The use of the word in a more positive sense crops up most frequently in IT and business operations settings (as "centres of competence"). It is nevertheless widespread and understood/accepted in continental Europe, including in name of the Swiss National Centres of Competence in Research (NCCRs). A Google search for "centre of competence" restricted to UK university websites (21,100 hits) yields far more references to continental European organisations (especially the Swiss NCCRs) than links to similarly named UK institutions. Searching the same websites for "centre of excellence" (108,000 hits) takes you directly to the homepages of UK academic and research organisations like <u>the British Heart Foundation Cambridge Centre of Excellence at the University of Cambridge</u> and <u>University College London's Academic Centre of Excellence for Cyber Security Research</u>.
konsequent	consistent, consistently ≠ consequent, consequently (folglich, deswegen)

Kontroller (Beruf), kontrollieren	management accountant; to check, monitor, verify ≠ control except in specific settings This concept can be difficult to pin down, but generally speaking, "control" in English suggests having the power to dictate the actions of others (Stephanie Shellabear, *False Friends in Business English*, p. 53). You will therefore find many cases where "control" is incorrect: e.g. things like "Kontrolle des Handgepäcks", which the Swiss Federal Chancellery translates as "hand baggage check", or "Kontrolle der Stimmberechtigung" ("verification of eligibility to vote"). In financial contexts, you will most often see references to "financial control" in the ordinary sense of financial management and keeping expenditures under control – not "controlling" in the sense of checking whether regulations are adhered to etc. The UK equivalents to ETH Zurich's "Finance & Controlling" unit are most often called the "Finance Division", "Finance Department" or "Finance Office". "Finance and Controlling" comes up most frequently in connection with accounting software from SAP (a German company).
Milliarde (see also Billion)	billion (1,000,000,000) A German *Billion* is an English trillion (1,000,000,000,000)
Mobbing, mobben	bullying, harassment; to bully or harass ≠ mobbing, to mob Workplace **harassment** can damage morale. Many schoolchildren have to contend with **bullying** at some point during their education. Any angry **mob** threw rocks at police. Elvis was **mobbed** by hordes of lovestruck teenagers. (surrounded by an aggressive or excited crowd)
Oldtimer	antique/classic/veteran car ≠ old timer (alte Hase)
Personal	personnel/staff ≠ personal (persönlich, privat)
Physiker	physicist ≠ physician (Arzt/Ärztin)
Preis	price (the cost of something), prize (an award for achievement) These are two separate meanings that each require the correct word.

II. Finding BSc or MSc project opportunities at ETH Zurich

From <u>M.C. Escher Collection</u> via Wikipedia

1. Topic
2. Approach
3. Expectation

- Applied mathematics, numerical analysis and scientific computing
- Data, algorithms, combinatorics and optimization
- Geometric analysis and PDE
- Geometry, groups and dynamics
- Insurance mathematics and stochastic finance
- Mathematics and teacher education
- Mathematical physics
- Number theory and geometry
- Probability theory
- Statistics
- Symplectic and algebraic geometry and topology

2. Approach

Contact potential advisors   *Not necessarily known from courses*

- Find out more about the person or group you are applying to
- Give specific reason why that is a good fit for you

    Favorite subjects? Interesting topics? Past experience?

- Preferably write an email   *Get the name right*
- Attach a transcript and say which courses you are currently taking
- Ask for availability or to discuss possibilities
- It is okay to politely insist if you do not get a response within a week
- Often it fails; people can be too busy   *Then write to somebody else*
- Often work with a junior member of a professor's group

3. Expectation

- Expect to work mostly **independently**.

    So it's important to pick a subject you like.

- Standards for **meeting** with the advisor vary a lot...

    ... from only twice in semester to once every one or two weeks.

- Expect a very **intensive final stretch** for writing up.
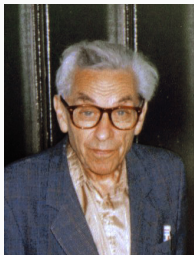   - *Separate your deadline from exams or other intensive commitments.*
    - *To be safer set an unofficial deadline two weeks before the official one.*

III. Collaboration

Collaboration in Mathematics

Mathematical collaborations
are on the rise

(link for statistics)

Pál Erdős (1913-1996)

most famous math collaborator

Photo by Kmhkmh via Wikipedia

Collaboration in Mathematics
is successful

(link for collaboration examples)

> **Paper 8 = Template to share on Overleaf**
> Check guidelines for Paper 8 on course webpage.

An expository paper, or lecture notes, or a longer slide presentation.

- discuss the structure, contents, layout, and level of detail
- find a compromise for a unified writing style
- coordinate the tasks and schedule
- cooperate!

☞ Organize groups *in the second hour*

> **Paper 7 = Template to share on Overleaf**
> Check guidelines for Paper 7 on course webpage.

Slides, or poster, or lecture notes, or cheat sheet, or exercise sheets, or CV.

- **NEW** Email by 3/Dec for scheduling template presentation on 10/Dec.

Plan for lectures on 3/Dec and 10/Dec

☞ 3/Dec guest lecture on *Lean* by David Loeffler

☞ 10/Dec topics to be determined

Please end topic suggestions by 3/Dec

Math presentation? LaTeX? More writing skills? Career planning?