

Appendix

To the Programme Regulations 2019 of the
Master's degree programme in Quantum Engineering

16 October 2018 (Version: 01 September 2019)

Applies to students who commence the degree programme in Autumn Semester 2020 or later, including students who are re-entering the degree programme.

This English translation is for information purposes only. The German version is the legally binding document.

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 Quantum Engineering. 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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1 Profile of requirements

Policy

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

1.1 Degree qualifications

¹ Admission to the degree programme presupposes a university Bachelor's degree comprising at least 180 ECTS⁽¹⁾ credits, an equivalent university degree, or a Bachelor's degree from a Swiss university of applied sciences⁽²⁾ in a discipline the content of which – also with regard to any additional academic requirements within the given framework – satisfies the pertaining academic and performance admission prerequisites.

² Said disciplines include, in particular (listed alphabetically):

- Electrical Engineering and Information Technology
- Physics
- Other engineering or physics disciplines

³ 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 degree programme presupposes basic knowledge and skills in Mathematics, Computer Science, Physics and Engineering which must in content, scope, quality and skill level be equivalent to those covered at ETH Zurich (discipline requirements profile).

² The **discipline requirements profile** comprises **110 ECTS credits (credits)** in total and is based on knowledge and skills covered in the ETH Bachelor's degree programmes in Electrical Engineering and Information Technology and Physics, 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.

¹ ECTS: European Credit Transfer System. Credits describe the average time expended to achieve a learning goal. One credit corresponds to 25-30 hours of work.

² A Diploma from a Swiss university of applied sciences is considered equivalent to a Bachelor's degree in the same discipline. A Bachelor's degree from a German or Austrian university of applied sciences is considered equivalent to a Bachelor's degree from a Swiss university of applied sciences.

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 three parts set out below. Details regarding the content of the corresponding course units are published in the ETH Course Catalogue (www.courses.ethz.ch).

Part 1: Basic knowledge and skills (80 credits)

Part 1 comprises at least 80 credits and covers basic knowledge and skills from the disciplines Mathematics & Computer Science and Physics & Engineering. The substance of the following course units is required:

Note:

Components marked with a (*) : Candidates are not required to complete all of the components listed, just a part. However, they must still acquire the minimum number of 40 credits in each discipline.

Discipline Mathematics and Computer Science (40 credits)

- Analysis
- Linear Algebra
- Complex Analysis
- Numerical Methods
- Programming
- * Probability Theory and Statistics
- * Data Structures and Algorithms
- * Methods of Mathematical Physics

Discipline Physics and Electrical Engineering (40 credits)

- * Mechanics and Heat
- * Oscillations and Waves
- * Electricity and Magnetism
- * Quantum Physics
- * Digital Circuits
- * Networks and Circuits
- * Signals and Systems
- * Computer Engineering

Part 2: Subject-specific knowledge and skills (18 credits)

Part 2 comprises at least 18 credits and covers subject-specific knowledge and skills drawn from core subjects in the two ETH Bachelor's degree programmes Electrical Engineering and Information Technology, and Physics³. Subjects include the following (the list is not complete):

- Electrodynamics
- Advanced Electromagnetic Waves
- Solid State Physics
- High-Speed Signal Propagation
- Optics and Photonics
- Quantum Electronics
- Quantum Mechanics
- Solid State Electronics and Optics

Part 3: Independent project work (12 credits)

Another requirement is the ability to conduct independent project work; here 12 credits must be earned in the framework of one or more Bachelor's degree projects.

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)⁽⁴⁾ must be provided.

³ Applicants to the degree programme who hold a Bachelor's degree from a university of applied sciences must, according to the pertaining additional requirements (see Section 2.2, Subsection 2), also supply proof of sufficient knowledge of German (level C1).

⁴ The required language certificates must be submitted by the application deadline. The ETH Zurich publishes a list of the language certificates accepted.

1.4 Performance prerequisites

Admission to the degree programme presupposes a very good study performance record in the preceding course of studies.

³ See the ETH Course Catalogue (www.courses.ethz.ch)

⁴ The required language level is measured according to the Common European Framework of Reference for Languages (CEFR) scale

2 Specific stipulations for admission and entry to the Master's degree programme

2.1 Application with a university Bachelor's degree

¹ Holders of a university Bachelor's degree or an equivalent university qualification must satisfy all of the prerequisites set out in Section 1.

² Admission may be subject to additional requirements.

³ Admission is not possible if

- a. the language prerequisites set out in Section 1.3 are not satisfied, or
- b. the performance prerequisites set out in Section 1.4 are not satisfied, or
- c. the number of additional credits required to satisfy the academic prerequisites exceeds 30 credits.

2.2 Application with a Bachelor's degree from a Swiss university of applied sciences

¹ Holders of a Bachelor's degree from a Swiss university of applied sciences must satisfy all of the prerequisites set out in Section 1.

² Admission is always subject to the acquisition of the missing academic and methodological knowledge and skills in the form of additional studies comprising at least 40 credits from Parts 1 and 2 of the academic prerequisites (see Section 1.2 above).

³ Admission is not possible if

- a. the language prerequisites set out in Section 1.3 are not satisfied, or
- b. the performance prerequisites set out in Section 1.4 are not satisfied, or
- c. the number of additional credits required to satisfy the academic prerequisites exceeds 60 credits.

2.3 Entering the Master's degree programme

¹ To students from an ETH Bachelor's degree programme who have been granted admission, the following applies:

- a. Said students can enrol in the Master's degree 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.⁽⁵⁾
- b. The normal ETH enrolment dates and deadlines apply.

⁵ The permitted number of missing credits is set out in the Programme Regulations of the respective consecutive Master's degree programme (e.g., BSc in Physics → MSc in Physics).

- 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 All other candidates who have been granted admission may only enrol in the Master's degree programme when they have completed the preceding (Bachelor's) degree.

3 Application and admission procedure

¹ All interested parties must submit an application for admission to the degree programme to the ETH Zurich Admissions Office. The specifications for application, in particular the documents required and the dates/deadlines for submission, are published on the website of the ETH Zurich Admissions Office (www.admission.ethz.ch).

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 and submits an application for admission/rejection to the Director of Studies.

⁵ On the request of the Director of Studies 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 he/she will be regarded as having failed the programme and will be excluded from it.

³ The deadlines and conditions for undergoing said performance assessments depend upon the background of the candidate (see Sections 4.2 and 4.3 below).

4.2 Candidates with a university Bachelor's degree

¹ Candidates holding a university Bachelor's degree 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.

4.3 Candidates with a Bachelor's degree from a Swiss university of applied sciences

¹ Candidates holding a Bachelor's degree from a Swiss university of applied sciences 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 two years of the start of the Master's degree programme at the latest.

² Session examinations may be combined in examination blocks. The examinations belonging to one examination block must always be undertaken during the same examination session.

³ A pass grade in the examination block is achieved if the average of the individual grades is at least a 4.

⁴ A failed performance assessment or a failed examination block may be repeated once. Repeating an examination block entails repeating all of the examinations belonging to it.