

Programme Regulations 2013
of the Master's degree programme in
Biomedical Engineering

Departments of
Information Technology and Electrical Engineering⁽¹⁾ (D-ITET)
Mechanical and Process Engineering (D-MAVT)
Physics (D-PHYS)
Health Sciences and Technology (D-HEST)

14 May 2013

This is an English translation only. The original German version is the legally binding document.

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¹ Leading department, pursuant to Art. 33, Para. 1 of the ETH Zurich Organisational Ordinance (*Organisationsverordnung ETH Zürich*) of 16.12.2003 (RSETHZ 201.021).

**Programme regulations 2013 of the
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The ETH Zurich Executive Board,

Pursuant to Art. 4, Para. 1, Lit. a of the ETH Zurich Organisational Ordinance (*Organisationsverordnung ETH Zürich*) of 16 December 2003 (RSETHZ 201.021),
decrees:

Chapter 1: General regulations

Part 1: General

Art. 1 Subject and scope, Appendix

¹ These Programme Regulations set out the requirements according to which the Master's degree in Biomedical Engineering may be acquired at the departments of Information Technology and Electrical Engineering (D-ITET), Mechanical and Process Engineering (D-MAVT), Physics (D-PHYS) and Health Sciences and Technology (D-HEST).

² D-ITET, D-MAVT, D-PHYS and D-HEST are joint sponsors of the specialised⁽²⁾ Master's degree in Biomedical Engineering. The degree programme is administrated by D-ITET, which is also the leading department.

³ 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-ITET, D-MAVT, D-PHYS and D-HEST.

Art. 2 Academic title

¹ Graduates of the ETH Zurich Master's degree programme in Biomedical Engineering are awarded the academic title

Master of Science ETH in Biomedical Engineering
(abbreviation: MSc ETH BME)

² This title may also be used in the abbreviated form "MSc ETH".

² A specialised Master's degree programme in the sense of Art. 3, Para. 3 of the Bologna Guidelines of the Swiss University Conference (SUK), 4 December 2003.

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 of 22 May 2012⁽³⁾ (*Leistungskontrollenverordnung ETH Zürich*)
- b. Ordinance on Admission to Studying at ETH Zurich of 30 November 2010⁽⁴⁾ (*Zulassungsverordnung ETH Zürich*)

Art. 4 Limitation on number of places in the programme

The number of places in the programme is limited. Every year D-ITET, in consultation with D-MAVT, D-PHYS and D-HEST, determines the number of places available for new students.

Art. 5 Course Catalogue

¹ D-ITET, in consultation with D-MAVT, D-PHYS and D-HEST, 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 Art. 4 of the General Ordinance on Performance Assessments at ETH Zurich⁽⁵⁾ and in the corresponding implementation stipulations⁽⁶⁾ of the Rector.

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 (*Richtlinien zum Kreditsystem*).⁽⁷⁾

Art. 7 Credits, basis for calculation

¹ Credits describe the average time expenditure required for a student to earn a study achievement.

³ SR 414.135.1, RSETHZ 322.021

⁴ SR 414.131.52, RSETHZ 310.5

⁵ SR 414.135.1, RSETHZ 322.021

⁶ See www.rektorat.ethz.ch/directives

⁷ See www.rektorat.ethz.ch/directives

² One credit corresponds to a workload of 30 hours. The workload includes all course-related activities required to obtain credits.

³ The curriculum is designed in such a way that full-time students can acquire an average of 30 credits per semester.

Art. 8 Allocation of credits

¹ D-ITET, D-MAVT, D-PHYS and D-HEST allocate a certain number of credits to each of the course units they offer.

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 it a certain number of 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-ITET records, checks and registers the credits acquired.

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

Part 1: Course description, structure and scope

Art. 11 Course description, structure

¹ Biomedical Engineering (BME) is an interdisciplinary area in which procedures and methods from the technical sciences, mathematics and physics are used to address and solve important current problems of biology and medicine. The degree programme deepens knowledge in biomedical technology corresponding to one of five specialisation tracks selected by students. With the semester project and the Master's thesis students gain experience in interdisciplinary research projects. Scientific training is complemented by freely chosen general electives from the humanities and social and political sciences.

² The specialisation tracks available for selection and further details regarding these and the individual curriculum are set out in Art. 19 – 21.

Art. 12 Scope, duration, limits on duration of studies

¹ As stipulated in Art. 33, 90 credits are required to obtain a 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 respective 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 semester for required extra credits in the range of 21 – 30 and by two semesters for required extra credits in the range of 31 – 60. For fewer than 21 required extra credits no extension is granted.

Art. 13 Language of instruction

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

Art. 14 Admission to course units

Special admission prerequisites may apply to the attendance of a particular course unit. These are determined by that ETH Zurich department or that university which offers the course unit.

Art. 15 Course progression, advice

¹ Details of the progression of the programme are published on the degree programme website.

² Study advisors, professors in the selected specialisation or the degree programme coordinator help students to design a curriculum, i.e. to select course units and themes for the semester project and Master's thesis. Further details regarding study advisors are found in Art. 20 and 21.

Art. 16 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. 4 and 5 apply.

² Credits from course units of other universities do not qualify as mobility credits if these course units belong to the degree programme curriculum.

³ Questions regarding student exchange may be referred to the mobility advisor of D-ITET.

⁴ If admission to the degree programme is subject to the acquisition of additional credits (admission with additional requirements) an exchange stay is only possible after all additional requirements have been fulfilled. Mobility credits may not be counted towards fulfilment of additional requirements.

⁵ Students who did not complete the preceding (Bachelor's) degree at ETH Zurich may not take part in ETH Zurich exchange programmes. Individual exchange stays are possible, but the recognition of mobility credits towards the Master's degree is not possible. These provisions do not apply to the semester project or the Master's thesis (see Para. 6).

⁶ The semester project or the Master's thesis may be undertaken at another university and be recognised towards the Master's degree provided that the written approval of the study advisor is secured in advance.

⁷ Students intending to undertake an exchange stay must draw up a written study plan in advance in consultation with the study advisor of the selected specialisation track. It should list the credits to be obtained at the host university. This study plan requires the approval of the D-ITET mobility advisor.

⁸ The Director of Studies of D-ITET makes the final decision on recognition of mobility credits. Treatment of transcripts of records is governed by Art. 16 of the Ordinance on Performance Assessments at ETH Zurich⁽⁸⁾ and the corresponding implementation stipulations⁽⁹⁾ of the Rector.

Part 2: Grouping by category

Art. 17 Grouping by category

¹ Performance achievements in the following categories are required to obtain the Master's degree. The minimum number of credits required in each category is set out in Art. 33.

- a. Specialisations
 - 1) Specialisation track core courses
 - 2) Specialisation track electives
 - 3) Biology courses
- b. Semester project
- c. Compulsory electives in humanities, social and political sciences
- d. Master's thesis

² D-ITET, in consultation with D-MAVT, D-PHYS and D-HEST, assigns course units to the categories in Para. 1 and publishes them in the Course Catalogue.

Art. 18 Overview of categories

¹ **Specialisation tracks**

Every specialisation track involves a group of courses structured into core courses, electives and biology courses. Their allocation to individual specialisation tracks is set out in the Course Catalogue. Specialisation subjects impart specific knowledge regarding the respective specialisation and generally comprise a lecture and practicals. The biology courses are only meant for those students who have no basic knowledge in the areas of biology, anatomy and physiology. Further details are found Art. 19 – 21; for stipulations regarding performance assessments see Art. 30.

⁸ SR 414.135.1, RSETHZ 322.021

⁹ See www.rektorat.ethz.ch/directives

² **Semester project**

With the semester project (project) students gain their first experience of interdisciplinary research project work. Further details, also regarding performance assessments, are provided in Art. 31.

³ **Compulsory electives in humanities, social and political sciences**

Students are required to select general course units from the offering of electives in humanities, social and political sciences (compulsory GESS electives). Further details are provided in the directives regarding compulsory GESS electives and in Art. 30 of these Programme Regulations.

⁴ **Master's thesis**

The Master's thesis generally concludes the degree programme and is supervised by a professor. With the Master's thesis students demonstrate their ability to conduct independent, scientifically structured work. Further details are given in Art. 32.

Part 3: Specialisation tracks, advisor and individual curriculum

Art. 19 Specialisation tracks

¹ The degree programme offers the following specialisation tracks. Students must select one of them at the time of application to the Master's degree programme.

- a. Bioimaging
- b. Bioelectronics
- c. Biomechanics
- d. Medical Physics
- e. Molecular Bioengineering

² Detailed descriptions of the individual tracks are published on the degree programme website.

³ Students may change their specialisation during the course of their studies. A change requires the written agreement of the new study advisor and the Director of Studies of D-ITET (see also Art. 23, Para. 4).

⁴ If credits have already been earned in the original specialisation, these may only be recognised towards the new specialisation if the latter also requires the corresponding subjects. The stipulations of Art. 21, Para. 3 also apply here.

⁵ A change does not entitle the respective student to an extension of the maximum permitted duration of studies.

Art. 20 Advisor

¹ Every specialisation has at least one study advisor. This person must be a professor at D-ITET, D-MAVT, D-PHYS or D-HEST.

² Each participating department designates a professor to represent it in matters regarding Biomedical Engineering. These representatives elect new study advisors by a simple majority. The choice is subject to the approval of the D-ITET Director of Studies.

³ The study advisors monitor students during the entire Master's degree programme and are available to provide guidance if necessary.

Art. 21 Individual curriculum

¹ At the beginning of the Master's degree programme the study advisor, in consultation with the student, determines the individual curriculum. This curriculum contains the required specialisation courses, and is binding. Only those specialisation courses listed in the curriculum may be recognised towards the Master's degree programme.

² The curriculum should guarantee solid, wide-ranging training and at the same time accord with the talents and expectations of the respective student. In particular, students with little knowledge of biology, anatomy and physiology should complete the biology courses.

³ On request, the study advisor of the chosen specialisation may also approve course units other than those offered for selection as specialisation courses.

⁴ Disagreements between a student and the study advisor regarding choice of courses are settled by the Director of Studies of D-ITET.

⁵ D-ITET determines the deadlines and other procedures for compiling and adjusting the individual curriculum.

Chapter 3: Admission to the Master's degree programme

Art. 22 Prerequisites for admission

¹ Persons may apply for the degree programme who hold a Bachelor's degree comprising at least 180 ECTS credits or an equivalent degree from a university or a Swiss university of applied sciences in a discipline which qualifies them for the degree programme. Qualifying disciplines are listed in the Appendix.

² Details of the academic, language and performance prerequisites for admission (profile of requirements) are provided in the Appendix.

Art. 23 Application, admission procedure and entry to the Master's degree programme

¹ All interested parties should apply to the ETH Zurich Rectorate for admission to the degree programme.

² The degree programme admissions committee investigates candidates' academic backgrounds and suitability for the Master's degree programme and submits a recommendation for admission/rejection to the Director of Studies of D-ITET.

³ The Rector decides whether to admit/reject the candidate on the basis of the recommendation of the Director of Studies of D-ITET.

⁴ Admission always proceeds for a specific specialisation track; this is noted in the admissions decision. Students admitted for a specific specialisation track have no associated right to admission to a different specialisation.

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

⁶ Details regarding application/registration, the admission procedure and entry to the Master's degree programme are determined by the Rector. They are set out in the Appendix.

Chapter 4: Stipulations on performance assessments

Part 1: General regulations

Art. 24 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. 25 Admission to performance assessments

Admission to performance assessments may be subject to conditions. These are specified by the department of ETH Zurich or the university offering the respective course unit.

Art. 26 Registering/deregistering for performance assessments

¹ The following stipulations apply to registration/deregistration for 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⁽¹⁰⁾ and the corresponding implementation stipulations⁽¹¹⁾ of the Rector.
- b. If the performance assessments fall into another category, registration and deregistration are handled directly by the respective lecturer.

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

Art. 27 Absence, interruption, abandonment, late submission or non-submission

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

- a. For ETH Zurich performance assessments the stipulations of the ETH Zurich Ordinance on Performance Assessments⁽¹²⁾ and the corresponding implementation stipulations⁽¹³⁾ of the Rector apply.
- b. For performance assessments of other universities the rules of the respective university apply.

¹⁰ SR 414.135.1, RSETHZ 322.021

¹¹ See www.rektorat.ethz.ch/directives

¹² SR 414.135.1, RSETHZ 322.021

¹³ See www.rektorat.ethz.ch/directives

Art. 28 Issuing of results, disagreements

¹ Students may view all of their performance results via the internet in the respective ETH Zurich application. They are informed by email when their examination results become viewable.

² Every communication outlines the procedure in cases of disagreement about newly documented results.

Art. 29 Unethical behaviour

The sanctions for unethical behaviour in the context of performance assessments are governed by the Disciplinary Code of ETH Zurich (*Disziplinarordnung ETH Zürich*) of 2 November 2004.⁽¹⁴⁾

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

Art. 30 Specialisation tracks, compulsory GESS electives

¹ Every course unit in the categories “specialisation track courses” and “compulsory GESS electives” 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 that 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.

Art. 31 Semester project

¹ The semester project may be undertaken at ETH Zurich, in industry, at a research institution or in a laboratory (even outside the ETH domain).

¹⁴ SR 414.138.1, RSETHZ 361.1

² Semester projects are supervised and evaluated by one or more professors and sometimes other persons. This is also true of semester projects undertaken outside ETH Zurich.

³ The supervisor of the semester project

- a. defines the theme of the semester project in consultation with the student;
- b. defines the task to be addressed;
- c. sets out the starting and submission dates of the project and the pertaining evaluation criteria in writing.

⁴ The maximum time allowed for the semester project is seven weeks if it is undertaken full-time. If the semester project is undertaken during the semester, parallel to lecture attendance, it may take up half of the time allotted for full-time studies, i.e. it may last 14 weeks. The Director of Studies of D-ITET may extend this if a request providing cogent grounds is submitted.

⁵ The semester project concludes with the submission of results, a final written report and a presentation. It is graded.

⁶ If the semester project is a group project the performance of each group member is graded individually.

⁷ The semester project is passed if it is awarded a grade of at least a 4.

⁸ A failed semester project may only be repeated once.

Art. 32 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;
- c. the 8 credits for the semester project have been acquired.

² The Master's thesis project may be undertaken at ETH Zurich, in industry, at a research institution or in a laboratory (even outside the ETH domain).

³ Master's theses are supervised and evaluated by one or more professors and sometimes other persons. At least one professor must belong to one of the departments offering the degree programme. This also applies to Master's theses undertaken outside ETH Zurich.

⁴ The Master's thesis normally addresses a theme from the selected specialisation. The Master's thesis supervisor

- a. defines the theme of the Master's thesis project in consultation with the student;
- b. defines the task to be addressed;
- c. sets out the starting and submission dates of the project and the pertaining evaluation criteria in writing.

⁵ The maximum time allowed for completion of the Master's thesis is six months. The Director of Studies of D-ITET may extend this if a request providing cogent grounds is submitted.

⁶ The Master's thesis must be innovative in a technical-scientific sense. It concludes with the submission of results, a final written report and a presentation. It is graded.

⁷ If the Master's thesis is undertaken in a group the performance of each group member is graded individually.

⁸ The Master's thesis is passed if it is awarded a grade of at least a 4.

⁹ A failed Master's thesis project may only be repeated once. If it is repeated, a new theme must be addressed. The repetition may be conducted with a new supervisor.

Chapter 5: Issuing of the Master's degree

Part 1: Credits by category and degree request

Art. 33 Credits by category

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 – 4.

- | | | |
|----|--|------------|
| a. | Specialisation track courses | 50 credits |
| | 1) Specialisation track core courses (at least 12 credits) | |
| | 2) Elective courses | |
| | 3) Biology courses | |
| d. | Semester project | 8 credits |
| e. | Compulsory GESS electives | 2 credits |
| f. | Master's thesis | 30 credits |

² In the category "Specialisation track courses" (Para. 1, Lit. a) the following stipulations apply:

- At least 50 credits must be earned in the selected specialisation. Of these, at least 12 must come from specialisation track core courses.
- For the Master's thesis only those specialisation track courses may be counted which are listed in the individual curriculum. For details regarding the curriculum see Art. 21.

³ The recognition of performance achievements or credits from a previous degree programme is not permitted. Exceptions are listed in Para. 4.

⁴ Credits earned at ETH Zurich may be recognised provided that the respective knowledge and skills gained are in content part of the degree programme and the respective credits have not already been counted towards a degree. Only credits earned in the categories "specialisation track" and "compulsory GESS electives" may be recognised. On the request of D-USYS the Rector decides whether credits can be recognised. There is no automatic right to recognition.

Art. 34 Degree request

¹ When they have fulfilled the requirements set out in Art. 33, students may request the issue of the Master's degree. The request must be made within three years of starting the Master's degree programme. If a request providing cogent grounds is submitted by the designated deadline the Rector may extend the deadline for the degree request.

² The request should contain all the performance achievements with pass grades in the categories listed in Art. 33, Para. 1 which are to be listed in the academic record. In each category the sum of the minimum number of credits set out in Art. 33, Para. 1 must be acquired.

³ The credits acquired by completing a course unit may not be split or counted more than once.

⁴ The maximum number of mobility credits countable towards the Master's degree programme is 30. The limiting provisions of Art. 16 apply.

⁵ A maximum of 100 credits are recognised towards the Master's degree.

Part 2: Academic record, degree certificate and Diploma Supplement

Art. 35 Documents

Students who complete the degree programme receive three documents: the academic record, the degree certificate and the Diploma Supplement.

Art. 36 Academic record

¹ The academic record serves as verification of the completed Master's degree.

² The academic record contains:

- a. The study achievements listed in the degree request according to Art. 34, Para. 2, including grades and other performance evaluation indicators
- b. The final grade, calculated as the weighted average of all the grades listed in the request with the corresponding credits as the weighting factor

³ A separate sheet of the academic record lists:

- a. Any additional admission requirements
- b. All further study achievements according to the corresponding implementation stipulations ⁽¹⁵⁾ of the Rector

⁴ D-ITET records, checks and registers the grades and other performance evaluation indicators and issues the academic record.

Art. 37 Degree certificate and Diploma Supplement

¹ Details regarding the degree certificate are set out in Art. 28 of the ETH Zurich Ordinance on Performance Assessments.⁽¹⁶⁾

¹⁵ See www.rektorat.ethz.ch/directives

¹⁶ SR 414.135.1, RSETHZ 322.021

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

Chapter 6: Final clauses

Art. 38 Definitive failure, exclusion from the degree programme

¹ The degree programme is regarded as definitively failed if either 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. 33 or any other conditions) can no longer be satisfied due to failure of performance assessments or failure to respect programme deadlines.⁽¹⁷⁾
- 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. 39 Transcript of records for non-graduating students (exclusion from 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. 40 Special cases

The Director of Studies of D-ITET settles cases which are not addressed or insufficiently addressed by these Programme Regulations and their Appendix, or other relevant ordinances and directives.

Art. 41 Entry into effect

¹ These Programme Regulations enter into effect on 1 August 2013.

² They apply to students who enter the programme from Autumn Semester 2013 onwards. This includes students who re-enter the degree programme from Autumn Semester 2013 onwards.

On behalf of the Executive Board

President: Ralph Eichler

General Secretary: Hugo Bretscher

¹⁷ Programme deadlines are the deadline for undertaking a performance assessment, individual assigned deadlines and the maximum permitted duration of studies.