ETH zürich



Study Guide

Master of Science in Micro and Nanosystems

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Study Guide – Master's programme in Micro and Nanosystems

Introduction

Micro and nanosystems are systems or devices that integrate electronic and non-

electronic elements, functioning at the micro or nano scale. Education in this field

concentrates on the synthesis of electrical and mechanical engineering. The

Department of Mechanical and Process Engineering (D-MAVT) and the Department of

Information Technology and Electrical Engineering (D-ITET) combine efforts in a joint

Master's programme in Micro and Nanosystems.

The Master's programme in Micro and Nanosystems offers a future-oriented education

to outstanding Bachelor graduates from all over the world. Micro and nanosystems

engineers need to master fundamental theoretical knowledge and application-specific

aspects of materials and their properties, quantum mechanics, novel properties of

devices, system integration, modeling and simulation.

This Master's study guide provides detailed information relating to the Master in Micro

and Nanosystems, according to the "Programme Regulations 2010 of the Master's

degree programme in Micro and Nanosystems" (regulation RSETHZ 324.1.0300.51 (in

German), an English translation will be soon available, but the original German version

is the legally binding document).

Zurich, November 2013

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1 Master's Programme

1.1 Programme Objectives

The Master's programme in Micro and Nanosystems offers an interdisciplinary curriculum, centered on mechanical and electrical engineering courses of importance to micro and nanosystems engineers.

Well-established companies, start-ups and emerging industries that utilize technology and system integration require a new generation of engineers who are familiar with a broad range of natural and engineering sciences. These engineers must create and drive innovations for new business opportunities.

The Master's programme in Micro and Nanosystems provides students with the knowledge and skills needed to meet these challenges. It provides a solid education for the micro and nanosystems engineers of today and tomorrow.

The backbone of the Master's programme curriculum is provided by core courses requiring interdisciplinary coursework. Elective courses in micro and nanosystems study systems or devices that integrate electronic and non-electronic elements and function at the micro or nano scale. Education in this field concentrates on the synthesis of electrical and mechanical engineering.

1.2 Tutor System

The Master's programme in Micro and Nanosystems is a tutor-driven programme. During the application phase each Master student must select an authorized faculty member working in the desired area of specialization to be their academic tutor. The tutor will be specified in the admission letter.

The tutor approves the student in the choice of core courses and advises in the choice of the elective courses, i.e. in the definition of an individualized curriculum that, while ensuring top-class specialized education, also takes into consideration the talents and expectations of the student. The tutor must approve the final individual curriculum. Furthermore, the tutor coaches the student throughout the programme, monitoring progress and if required, proposes necessary adjustments to enhance the student's performance.

Professors of the different departments at ETH Zurich, who are involved in teaching and research related to one or more aspects of micro and nanosystems, are authorized to act as tutors (see Annex 7.1). 16 professors are acting as tutors in the different ETH departments (Mechanical and Process Engineering, Physics, Information Technology and Electrical Engineering, Department of Biosystems Science and Engineering) with various specializations. The tutors, lecturers, institutes and laboratories involved in the Master's programme are listed on the web page:

→ http://www.mastermicronano.ethz.ch/people/index

The agreement between the Master's tutor and student – Master Curriculum (in the following text denominated as the Tutor Agreement, Annex 7.2) must be submitted to the D-MAVT Student Administration within 3 weeks of the start of the semester. The Tutor Agreement can be updated or changed during the study period. The updated version should be approved by the tutor and submitted to the Student Administration.

At the student's request the Director of Studies may approve a change of tutor if cogent grounds are given. Changes are only possible at the beginning of a semester. A change does not result in an extension of the maximum allowable study duration.

1.3 Curriculum's structure

The backbone of the Master's curriculum comprises interdisciplinary courses in mechanical and electrical engineering. The focus is on fundamental theoretical

knowledge and application - specific aspects about materials and their properties, quantum mechanics, novel properties of devices, system integration, modeling and simulation.

The programme is based on the high educational level of ETH Zurich's Bachelor's programmes in Mechanical Engineering and Electrical Engineering and Information Technology. It takes into account the individual needs of students from varying disciplines to acquire knowledge in all relevant fields.

The content of the programme is balanced between basic theory, fundamental methodology and application-specific topics. The programme is based on a combination of lectures and independent research projects. Tools ranging from computer simulation to advanced experimental techniques are introduced and applied in order to provide a deeper understanding of the underlying phenomena, processes and system characteristics. In addition, during a twelve-week internship, students are involved in industrial projects in Switzerland or abroad.

Project work, in which theory and practice are combined, stimulates students' involvement in research and innovation. Student semester projects are aimed at solving engineering problems while advancing team skills, effective communication, and creativity. The six-month full-time Master's thesis advances these skills as well as the capability of students to work independently and creatively toward the solution of a research problem.

During the Master's programme, students must obtain 90 ECTS for a Master's degree, of which at least 60 ECTS must be from ETH Zurich. The curriculum is structured in six categories. In each category a given number of credit points must be attained.

Category	ECTS	Description	
Core Courses	36	Recommended and elective courses	
Multidisciplinary Courses	6	Deepening scientific knowledge or extending acquired skills courses at ETHZ, EPFL, UZH and University of St. Gallen	
Courses in Humanities, Social and Political Sciences GESS	2	General education in humanities, social and political sciences	
Semester Project	8	First experience in the solution of a specific engineering problem	
Industrial Internship	8	12-week internship in a Swiss or foreign company	
Master's thesis	30	Independent scientific work	

Curriculum Structure

1.3.1 Core Courses

The Core Courses lay the foundation for the Master's programme by providing the students with core knowledge in their area of specialization. A minimum of 36 ECTS must be completed in the category "Core Courses". This is usually equivalent to eight – nine Master courses.

The students make their choice together with the tutor, who can suggest highly recommended courses and electives and has to approve the study plan. In order to facilitate the choice, the Course Catalogue allocates the recommended core courses to 5 different topical areas, primarily in order to guide the students in the choice of courses. These topical areas are not equivalent to different specializations. They serve as the starting point for planning an individualized curriculum, but students are free to choose optional courses from more than one area:

- Devices and Systems
- Energy Conversion and Quantum Phenomena

- Material Surfaces and Properties
- Modelling and Simulation
- Laboratory courses

Elective courses in physics, chemistry, biology, particle technology, material science, computational science, business administration and management allow students to tailor the programme to match their individual aspirations and provide the complementary knowledge graduates need in order to create marketable and innovative products. The social context in which micro and nanosystems engineering is applied and its broad interdependencies are addressed in courses in humanities, social science and political science.

The list of the core courses offered is presented in:

- → http://www.mastermicronano.ethz.ch/curriculum/core courses/recommended
- → http://www.mastermicronano.ethz.ch/curriculum/core courses/electives

Information regarding the single course is provided by the course catalogue:

→ www.course-catalogue.ethz.ch

1.3.2 Multidisciplinary Courses

These courses (6 ECTS) can be used either to add depth to scientific and technical knowledge related to the chosen specialization, or to add breadth to the range of skills in other disciplines, such as economics, management or the humanities.

The multidisciplinary courses may be selected from among the complete course catalogue of ETH Zurich, EPF Lausanne, University of Zurich and the University of St. Gallen.

1.3.3 Compulsory Electives in Humanities, Social and Political Sciences

Courses in Humanities, Social and Political Sciences (2 ECTS) integrate scientific and technical knowledge with the corresponding social, economic, legal, political, and cultural environment.

These courses are selected from the special course catalogue "GESS compulsory electives" (Pflichtwahlfach GESS) of the Department of Humanities, Social and Political Sciences (D-GESS) at ETH Zurich.

- → www.gess.ethz.ch/studies/pwf/index_EN
- → www.ethz.ch/content/dam/ethz/common/docs/weisungssammlung/filesde/pflichtwahlfach-gess.pdf

1.3.4 Semester Project

The Semester project makes use of the technical knowledge acquired during the Master's programme and is aimed at training the students in the solution of specific micro and nanosystems problems.

The Semester project is directed by an ETH professor and must be approved in advance by the tutor and included in the Tutor Agreement. It is generally undertaken in the second semester.

The supervisor proposes the subject of the project, elaborates the project plan, defines the roadmap together with the student and monitors the overall execution. The project is realized in 240 hours. The project is concluded with a written report and a presentation. 8 ECTS will be awarded for successful completion.

It is necessary to include the Semester project in the registration in myStudies in order to receive the credit points in the right category. Successfully completing the Semester project is a pre-condition for embarking upon the Master research project.

1.3.5 Industrial Internship

The main objective of the 12-week internship is to expose Master students to the industrial work environment. The Industrial Internship can be undertaken in a Swiss or a foreign company and must be approved by the tutor. Very exceptionally, a research institute outside the ETH domain can also be chosen.

The internship must be at least 12 weeks long and can be undertaken before the student starts his Master's studies, during the study or after the Master's thesis. The first option is preferred. The internship cannot be split into more than two parts.

The aim of the internship is to apply engineering knowledge (e.g. CAD, construction, mechanics, electronics, budgeting) to practical situations.

An internship could involve:

- Product design
- Planning
- Internal research and development
- Machine and plant engineering
- Pre, post and running calculations
- Technical computations
- Construction mechanical, electrical, mechatronics
- Organization and operational data processing
- Industrial safety, including the safety of machines and mechanisms
- Manufacturing
- Manufacturing planning
- Ecological investigation of products and procedures
- Production (only novel production procedures)

Tutors can often support their students in finding a suitable internship position. Further useful information can be found on ETH student's portal and IAESTE Switzerland or on the web page of D-MAVT.

- → www.ethz.ch/news/openpositions/index_EN
- → www.eth-gethired.ch
- → www.iaeste.ch
- → www.mavt.ethz.ch/pdienst/industrial/internship

To acquire the 8 ECTS for the internship, the student must complete the following steps:

- Obtain an internship (with or without the help of the tutor).
- Work in a company or a research institute for at least twelve weeks.
- Receive a letter of confirmation from the company.
- Write an activity report (1-3 pages) by keeping trade secrets with information about the company, a description of the activities and its position in the market, tasks performed and skills achieved.
- Submit (by regular mail) the documents to the D-MAVT Internship Services for their approval:

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Internship Services

ML K44

Sonneggstrasse 3

8092 Zürich

E-Mail: Praktikantendienst@mavt.ethz.ch

www.mavt.ethz.ch/pdienst/index

It is necessary to include the industrial internship in the registration in myStudies in

order to receive the credit points.

1.3.6 Master's thesis

The Master's thesis concludes the Master's programme and constitutes a maximum

six-month, full-time project aimed at advancing the skills and capabilities of students to

work independently and creatively toward the solution of an independent research

problem, which has been agreed upon in advance.

The Master's thesis is either closely related to the research activity of the tutor or of an

ETH Zurich professor (acting as supervisor) or deals with a challenging topic faced by

industry.

The tutor approves the choice of another supervisor and the subject of the Master's

thesis. The tutor or the supervisor defines the road map together with student and is

responsible for monitoring the structure and quality of the thesis. Dates for completion

of the Master's thesis and the criteria for assessment are set by the tutor or the

professor who supervises the thesis.

In order to start the Master's thesis, students must:

have obtained a Bachelor's degree;

have fulfilled all specified admission conditions;

have achieved at least 32 credits in the category "Core Courses";

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have acquired the 8 credits for the Semester project.

Upon successful completion of the Master's thesis (minimum grade 4.0), students are awarded 30 ECTS. If a Master's thesis is not successfully completed, a new topic must be defined. Only one repetition is permitted.

To carry out the Master's thesis in the industry, the approval of the tutor is required.

Any form of remuneration may not be agreed upon by students or institutions of ETH Zurich with third parties. Expenses, however, may be paid by third parties.

→ www.ethz.ch/content/dam/ethz/common/docs/weisungssammlung/filesde/bezahlung-schriftl-arbeiten-dritte.pdf

If secrecy between ETH Zurich and the industrial partner is required, it has to be specified in an arrangement between the responsible professor and the company.

The ownership of the property laws have to be regulated for each particular case.

→ www.share.ethz.ch/sites/rechtssammlung/default.aspx

1.4 Master's degree

After gaining all required credit points in total and in each category, students can file for a diploma request.

The following prerequisites must be fulfilled:

- All credit points from the six categories have been obtained
- The list of Core Courses corresponds with the Tutor Agreement (Master Curriculum) signed by the tutor.
- The application takes place within three years of beginning the Master's programme.

When these prerequisites have all been completed, the Master's degree will be conferred and the student may assume the title of:

Master of Science ETH in Micro and Nanosystems

(MSc ETH MNS)

The shorter form MSc ETH may be used.

Students may have 100 ECTS recognized for the Master's degree; additionally obtained credit points may be listed at the student's request on the addendum to the final academic record (Addendum Master's degree – Academic Record Translation).

The Overall Grade Point Average of the Master's degree is composed of the weighted grade point average of the following grades:

Category	<u>Weight</u>
Core Courses	5
Semester project	1
Master's thesis	4

The grade point average of the Core Courses is weighted according to the credit points of each course (consisting of the weighted means of all grades issued in this category; the grade's weighting equates to the corresponding number of credit points). The Industrial Internship, the courses of "Pflichtwahlfach GESS" and the Multidisciplinary Courses do not influence the Master's degree grade.

Students receive German and English transcripts, ranking information and a diploma supplement, in addition to an official diploma either in German, French or Italian.

Outstanding students with an overall average grade of 5.75 (or higher) will be awarded with the title "passed with distinction". This title will be specified on the diploma and the transcript.

1.5 Duration

The Master's degree is designed as a full-time study programme. The completion of 90 ECTS requires on average 3 semesters, or one and a half years of study. The Master's degree must be obtained within three years, otherwise credits will expire and students may be disqualified from graduation.

If an applicant for the Master's programme is accepted with additional requirements, the maximum permitted duration of studies may be extended by half a year for required extra credits in the range of 21 – 30 and by one year for required extra credits in the range of 31 – 60. For fewer than 21 required extra credits no extension is granted.

The Rector may approve an extension of the study duration under special circumstances.

1.6 Language

The teaching language of the Master's programme in Micro- and Nanosystems is predominantly English. Courses at ETH are held either in German or English. The Course Catalogue indicates the language used for the courses and the exams.

2 Administrative Application – myStudies

The web application "myStudies" enables ETH Zurich students to execute their administrative tasks online. myStudies application is available to all active ETH Zurich students, using the "nethz" (username) and password. The username and password will be assigned by the Rectorate once complete enrollment documents are received by ETH Zurich.

→ www.mystudies.ethz.ch/index_en

Essential functions in this application are:

At the semester start:

- Enroll for the coming semester or take a semester on leave of absence.
- Register for course units (lectures, colloquia, exercises, Semester projects/ papers).
- The personal weekly schedule can be checked in accordance with the enrollments.

During the semester:

- Registration for examinations, withdrawal from examinations.
- Publication of the personal examination timetable.
- Access to electronic learning materials.

At the end of the semester:

 Check and print the course attendance confirmation sheet and/or the study overview.

After the performance assessment session:

- The results of performance assessments decreed can be checked in the transcript of records and relocated if necessary.
- Submit the request to issue the degree.

3 Performance Assessment

A performance assessment is required for all courses of the programme. The type of assessment is defined by the lecturer. For example, assessments can be made through exercises, projects, presentations or tests. Details may be found in the Course Catalogue of ETH Zurich.

→ www.course-catalogue.ethz.ch

Credit points are only issued if the assessment is graded with at least a 4.0 (out of a 6.0) or a "pass". The Core Courses, the Semester project and the Master's thesis must be assessed with a grade. In the case of unsatisfactory performance, the performance assessment may be repeated once, whereas the Semester project and the Master's thesis need to be on a new subject.

3.1 Grading System

Courses can be assessed with "pass/fail" or with a grade. A course is passed if the grade is 4.0 or higher. In Switzerland the following general grading scale is used:

6.0 – 5.75	excellent
5.5 - 5.25	very good
5.0 – 4.75	good
4.5 – 4.25	satisfactory
4.0	pass
3.5	fail
3.0	poor
2.5	very poor
2.0	extremely
	poor
1.0	not
	measurable

Grading scale

The grading scale at ETH Zurich ranges in courses with quarter grade steps (0.25). ETH Zurich does not use the ECTS Grading Scheme.

3.2 Credit Points

The credit system of ETH Zurich is based on the European Credit Transfer System (ECTS). Credits are assigned to each learning unit according to the expected student workload.

The ECTS system is based on the workload of a student. 60 ECTS are equivalent to one year of full-time study (about 1800 hours). Therefore, 1 ECTS corresponds to a 30 hour workload.

Courses at D-MAVT are indicated with credit points as well as weekly hours. In general 4 ECTS are equal to 3 hours contact time (lecture + exercises).

Credit points are awarded for successfully completed assessments. Partial awarding of credit points is not allowed. Students must file for the Master's degree within the stipulated time frame or credits will expire.

A summary of the student's credit points can be found at:

→ www.mystudies.ethz.ch/index_en

Credits acquired via courses which are offered in ETH Bachelor's and Master's degree programmes may be recognized towards the Master's degree if these credits have not already been counted towards the Bachelor's degree.

It is not possible to recognize ECTS credits obtained from previous studies outside ETH Zurich.

3.3 Examinations

Information on the examination mode for every course can be found in the Course Catalogue in the category "Performance assessment information":

→ www.course-catalogue.ethz.ch

ECTS credits	Number of ECTS received after successfully completing examination		
Examiners	Name of the lecturer		
Туре	Session examination or end-of-semester examination, graded or ungraded semester performance		
Language of examination	German / English		
Course attendance confirmation required	Not required		
Repetition	Repetition only possible after re-enrolling for the course unit / repetition possible without re-enrolling for the course unit		
Additional information on mode of examination	Any additional information about the exam		
Mode of examination	Oral/Written, duration		
Written aids	Pocket calculator, compendium, etc		

Information about examinations in the Course Catalogue

If a change in specification affects the ongoing semester, students will be informed.

Master examinations are always single and conducted individually.

At ETH Zurich different types of examination are possible:

<u>Session examinations:</u> This form of performance assessment is carried out during the examination sessions, which are held twice a year (once in the winter session (January/February) and once in the summer session (August)). Students must register

for session examinations during the registration period. These examinations are planned by the Examinations Office and are listed in the student's personal examination schedule, which is shown in myStudies. Not all session examinations are offered each session. There are performance assessments which are only offered in the session immediately after the course. These examinations are identified in the Course Catalogue by the following label: "Repetition only possible after re-enrolling for the course unit".

End-of-semester examinations: This form of performance assessment is carried out during the last two weeks of a semester and during the first two weeks after the end of the semester. Registration during the prescribed period is also necessary for performance assessments. The examination dates are announced by the lecturer offering the course. These examinations are thus not shown in the examination schedule in the online enrollment. If it is possible to repeat a performance assessment without re-enrolling in a course, a repetition date, generally at the start of the following semester, is offered. The lecturers offering the course also announce these dates. Students must register for a repetition date using the online enrollment; this is only possible once the Administration Office has officially published the results.

<u>Semester performance</u>: This usually takes the form of integrated performance assessments during the semester or performance assessments which take place outside of the normal semester schedule (e.g. block courses). Semester performances may be graded or ungraded. No separate registration is required for this form of performance assessment. However, students must enroll in the respective course.

Registration for / withdrawal from examinations

The student must register for the examination during the third or fourth week of each semester:

- → www.mystudies.ethz.ch/index en
- → www.ethz.<u>ch/students/en/studies/performance-assessments/registration.html</u>

The provisional specifications are on the personal examination plan, which is published on

→ www.mystudies.ethz.ch/index en

about four weeks (Spring semester), respectively six weeks (Autumn semester) before the end of the semester.

It is possible to withdraw from examinations via myStudies (otherwise the examination will be considered as a first attempt), according to the following deadlines:

- Session examinations: from the third week of the semester until Sunday at midnight (24:00 hours) one week before the start of the examination session.
- End-of-semester examinations: from the third week of the semester to the penultimate week of the semester (Monday morning, 8:00 hours).

4 Mobility

A period of stay as a mobility student at another university enriches the student's experience and extends their horizons. Apart from a view of the research and theory at other universities, a semester abroad offers the possibility to learn about other cultures and ways of life and of deepening language knowledge. Therefore, ETH Zurich and D-MAVT promote and support student mobility. The exchange programmes are normally not open for students in the Master's programme without an ETH Bachelor; for this category of students, if the tutor or the supervisor agrees, it is possible to carry out the Master's thesis abroad.

Applications to mobility programmes will be considered only for students with a good study profile, i.e. continuity in completing coursework, good grades and when supported by the tutor. Moreover, the student has to prove his knowledge of the local foreign language.

The tutor approves the suggested programme of the courses to be carried out at a partner university in the "Core Courses" category and the research projects in the category "Semester project" or "Master's thesis". The agreement has to be submitted to the D-MAVT Student Administration.

According to ETH Zurich regulations, at least two-thirds of the credit points required for a Master's degree must be obtained at ETH Zurich. This condition implies that a maximum of 30 credit points may be obtained at another university and counted towards a D-MAVT Master's degree. Furthermore, at least 12 credits in the category core courses (36 ECTS) have to be achieved at ETH Zürich.

In addition to institutional partnerships and exchange programmes with European, American, Australian and Asian universities, professors at D-MAVT have contacts with other universities and there is often the possibility to write a Master's thesis as part of a research project conducted outside of ETH Zurich.

Mobility credit points must be recognized by the Student Administration of D-MAVT and must therefore be discussed prior to departure with a mobility advisor. An agreement exists between some universities and the ETH Zurich for the recognition of courses and credit points. Up to one year is needed to plan and organize an exchange semester.

The Student Exchange Office at the Rectorate advises and supports study exchanges with partner universities at home and abroad:

→ www.mobilitaet.ethz.ch/index_EN

D-MAVT Mobility Advisor:

→ http://www.mavt.ethz.ch/people/departementsadministration

4.1 Planning an Exchange Semester

In planning an exchange semester, the student must organize and prepare the necessary documentation. The documentation required and the time schedule depends on the specific program and the student must follow the instructions given by D-MAVT Student Administration and the ETH Student Exchange Office for each program.

The following steps must be taken:

1) Students should obtain information about the host university on the web page of D-MAVT (possible host universities and experiences of former students can be found on the pages of the Exchange Office).

- 2) The student must discuss the possibility of an exchange with their tutor. They should clarify with the tutor whether they are interested in taking courses or completing their Master's thesis during this semester.
- 3) The student must discuss their plans with their mobility advisor. The advisor will decide on their participation with the host university. If several students are interested in an exchange semester at the same university, a selection will be made.
- 4) Subsequently the student must prepare a study program and check it with their tutor and mobility advisor. Ideally, it should be structured in a way to replace the courses the student would forego at ETH.

5 Programme Requirements, Application and Enrollment

5.1 Programme requirements

The Master's programme in Micro and Nanosystems has a strongly interdisciplinary nature and students can apply to the programme on the basis of a Bachelor's degree in:

- Electrical Engineering and Information Technology
- Mechanical Engineering
- Microsystems Technology

Candidates for the Master's programme must present proof of specialized and sound knowledge and abilities in the fields of science and engineering. These skills are a minimum requirement and serve as a basis for the admission process.

To be admitted, students must meet the following requirement profile, largely covered by the common elements of the first 2 years of a university education in science and engineering. The programme requirements are based upon skills and knowledge taught in the ETH Bachelor's programmes. These requirements represent 110 ECTS:

- Minimum required contents in basic knowledge and skills: 50 ECTS e.g. Analysis
 I + II + III, Linear Algebra, Physics I + II; Informatics and Engineering Sciences;
- Minimum required contents in Engineering Sciences: 60 ECTS, e.g. practical experience in physics and engineering focusing for example, in one of the following areas: electronical components and analog integrated circuits; electromagnetic fields and waves; functional materials and particle technology; integrated systems; mechanics; mechatronics; microrobotics and intelligent systems; microsystem technology and nanotechnology; nanophysics; physical chemistry and sensor technology.

Admission of all applicants is based on the programme's requirements. The following points will be considered in the evaluation process:

- Assessment of the profile
- Performance and grades
- Personal letter of application describing personal goals and motivation for studying for the Master in Micro and Nanosystems at ETH Zurich
- Three preferred tutors and their order of preference
- 2 letters of recommendation
- GRE Test
- Any additional documents that may be relevant for the application, such as scientific or professional publications, awards, information about previous education, etc.
- An English test (Level C1) for non-native speakers (TOEFL, IELTS or equivalent).

The evaluation of the Bachelor's degree is made based on the corresponding Bachelor of Science degree at ETH Zurich. Admission is made based on an individual evaluation of the application file (evaluation sur dossier) to establish whether students have sufficient prerequisite courses in their Bachelor's degree.

Students whose Bachelor's degree does not fully meet the requirement profile can be admitted with the requirement that they obtain additional credits from Bachelor courses. Of the additional requirements, a maximum of 30 ECTS may be completed during the Master's programme.

Students holding a degree from a Swiss University of Applied Sciences are admitted with the precondition that they must take a minimum of 40 ECTS, up to a maximum 60 ECTS of additional courses. The additional requirements depend on the specialization at the Swiss University of Applied Sciences.

Students can be admitted with or without additional requirements, but they may be rejected as well. The Rectorate will inform the students in writing of their decision.

5.2 Application

The Rectorate receives all applications. The application form and detailed information about the application can be found on the web:

Information/guidance: → www.ethz.ch/en/studies/registration-application/master.html

ETH students have to apply for the Master in Micro and Nanosystems, online in the admission category "Graduates of ETH Zurich".

It is possible to start the Master's programme at the beginning of both semesters, in spring or in autumn, but students are encouraged to enter the autumn semester because more courses are offered.

A non-refundable handling fee is payable with the application. There is no fee for candidates from ETH Zurich, EPF Lausanne and holders of an IDEA League Scholarship.

5.3 Registration and Enrollment

Upon admission, students receive an invitation to enroll from the Rectorate, together with the information requested for the admission. Upon successful enrollment, students are matriculated and receive their access data for all web tools.

All students must enroll for the chosen Master's programme via the electronic enrollment system (myStudies). This tool is also used to enroll for the courses; this should be done after the tutor approves the chosen courses (Agreement between Master Tutor and Student).

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Students from ETH Zurich who have not finished a Bachelor's programme must enroll

for both the Bachelor's programme and the Master's programme. Semester fees are

only billed once.

→ www.mystudies.ethz.ch/index en

5.4 Visa and Residence Permit

Students must submit visa applications in person at the Swiss diplomatic mission

(embassy or consulate general) in their country of residence at least three months

before entering Switzerland. The following link clarifies whether the student needs a

visa or not:

→ www.bfm.admin.ch/bfm/en/home.html

→ www.ethz.ch/en/studies/international-immigration-housing.html

The application must be supported by all of the documents listed in "Guidelines for

entering Switzerland for foreign students"

→ www.ethz.ch/content/dam/ethz/main/education/internationales/pdf-

en/guidelines-master-en.pdf

For questions concerning residence authorization, students can contact:

International Student Support

HG F 22 3

Phone: +41 44 632 20 95

Fax: +41 44 632 11 17

E-Mail: international@rektorat.ethz.ch

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5.5 Scholarships

A limited number of scholarships is available for applicants with outstanding academic records:

Excellence Scholarship

→ www.ethz.ch/en/studies/financial/scholarships/excellencescholarship.html

Markus Meier Funds (students with FH or CH Bachelor's degree)

→ www.markusmeier.ethz.ch/

6 Useful Information about ETH Zurich

6.1 ETH in Short

Consistently rated among the top universities in Europe, ETH Zurich is a leading participant in the world of research and education in Switzerland and abroad. Its 16 departments offer Bachelor, Master and Doctoral programmes in engineering and natural sciences.

ETH Zurich has more than 17,000 students from approximately 80 countries, 3,700 of whom are doctoral candidates. More than 400 professors teach and conduct research in the areas of engineering, architecture, mathematics, natural sciences, system-oriented sciences, and management and social sciences.

21 Nobel Laureates have studied, taught or conducted research at ETH Zurich, underlining the excellent reputation of the institute; the most famous graduate of ETH was none other than Albert Einstein.

The international environment – close to 60% of the professors come from outside of Switzerland – and the excellent teaching and research infrastructure make ETH Zurich the ideal place for creative individuals. Connections with business and industry are strong, as the Greater Zurich Area is the economic centre of Switzerland and home to numerous international companies.

ETH has two principal locations: one in the centre of Zurich and the Science City campus at Hönggerberg, just outside the city. Students participating in the Master's programme in Process Engineering spend most of their time at the central campus.

→ www.ethz.ch

6.2 Zurich - the City

Zurich is well-known as a safe and attractive city – indeed, for several consecutive years it has been ranked as having the highest quality of life in the world. Despite its relatively small size (380,000 inhabitants), the city has an international metropolitan flair and offers an extensive range of leisure amenities.

While Berne is Switzerland's political capital, Zurich is considered its business capital: formerly an industrial town, the city's focus has shifted to commerce and knowledge-intensive enterprise.

With its theatres, concert halls, museums, art galleries, libraries, bookshops, and educational institutions at all levels, Zurich is also a centre of cultural importance.

Its location on Lake Zurich and its proximity to the Alps and other places of scenic interest make Zurich a pleasant place to live in both summer and winter.

Zurich has excellent air, rail and road connections. Eurocity and Intercity trains from all directions stop at the central station. Within the metropolitan area, there is a combined network of public transportation, linking rapid suburban rail, trams, buses and boats.

6.3 Tuition and Cost of Living

Students should budget between CHF 22,000 and 24,000 (Euro 18,000 to 20,000) per year for tuition and cost of living. This covers tuition and student fees (CHF 664 per semester, as higher education is publicly funded in Switzerland), accommodation, subsistence, health insurance and other personal costs.

→ www.ethz.ch/content/dam/ethz/main/education/finanzielles/files-en/cost-of-living.pdf

6.4 Maps and Directories

Zurich City Guide

→ www.stadtplan.stadt-zuerich.ch/zueriplan/stadtplan.aspx

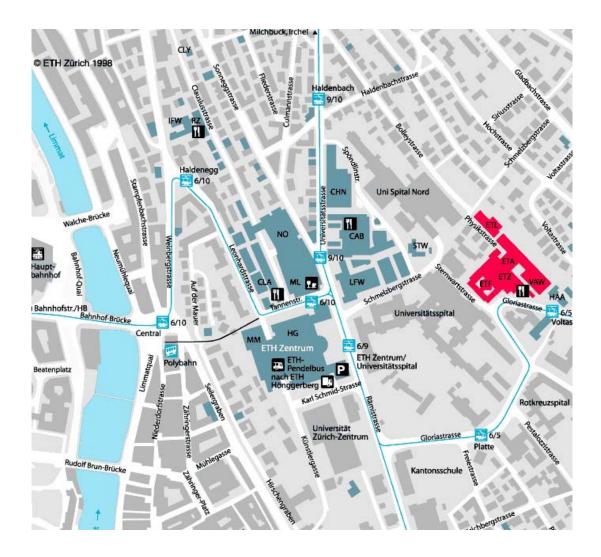
Location of D-MAVT and ETH Main Building

→ www.mavt.ethz.ch/about/wegbeschrieb



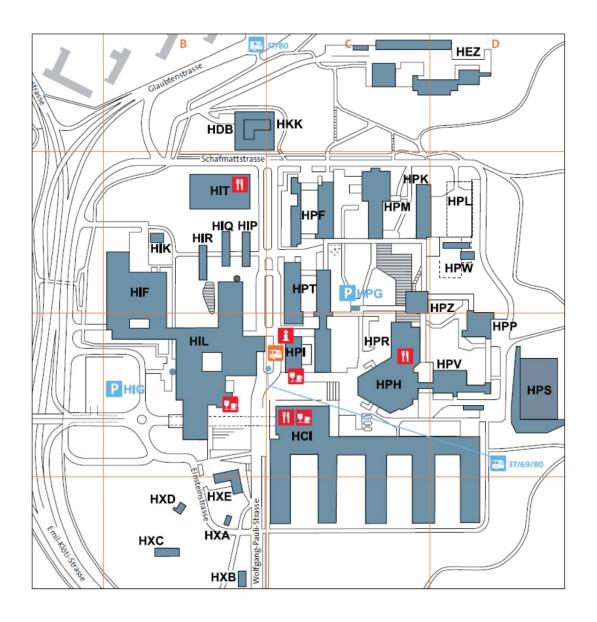
Location of D-ITET

 $\rightarrow \underline{ \text{http://www.ee.ethz.ch/en/general-information/about-d-itet/facilities-} } \\ \underline{ \text{services.html}}$



Location of ETH Hönggerberg

→ www.ethz.ch/about/location/hoengg



6.5 D-MAVT Contacts

General information about the Department of Mechanical and Process Engineering:

→ www.mavt.ethz.ch/index

Student Administration of the Department of Mechanical and Process Engineering ETH Zurich
ML K44
Sonneggstrasse 3
CH-8092 Zurich

Opening hours of Student Administration & Internship Services:

During the semester Tue: 09:00 – 13:00, Thu: 13:00 – 16:00

Wed & Fri: 09:00 - 12:00

During the semester break Tue & Fri:09:00 – 12:00, Thu: 13:00 – 16:00

or consultation by appointment

Student Administration (general questions, administration, examinations):

Phone: +41 44 632 24 57 or +41 44 632 24 52

ETH Zentrum, ML K44

E-Mail: info@mavt.ethz.ch

Study Guide – Master's programme in Micro and Nanosystems

Coordination for mobility, admission, special questions, interim arrangements:

Phone: +41 44 632 21 99 ETH Zentrum, ML K44

Consultation by appointment

Internship Services

Phone: +41 44 633 32 83

ETH Zentrum, ML K44

E-Mail: praktikantendienst@mavt.ethz.ch

6.6 Contacts at Rectorate

Listed below are some of the most important web links and contacts. The Rectorate is

responsible for the administration of teaching und hence for study in general, but not for

the study programs in detail.

→ www.ethz.ch/students/en.html

International Student Support

ETH Zurich, Main Building, HG F22.3

Phone: +41 44 632 20 95

E-Mail: international@rektorat.ethz.ch

Admissions Office

ETH Zurich, Main Building, HG F 21.2-21.5

Opening hours for Master students: Mon-Fri 11:00-13:00

Phone: +41 44 632 93 96; +41 44 632 28 80; +41 44 633 91 78

E-Mail: master@ethz.ch

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Registrar's Office

Registration, enrollment, semester on leave of absence

ETH Zurich, Main Building, HG F 19

Opening hours: Mon-Fri 11:00-13:00

Phone: +41 44 632 30 00, Fax: +41 44 632 10 61

E-Mail: registrar@rektorat.ethz.ch

Examinations Office

ETH Zurich, Main Building, HG F 18.1

Phone: +41 44 632 20 68

E-Mail: exam@ethz.ch

Opening hours: Mon - Fri: 11:00 - 13:00 or by appointment

6.7 Further Contacts and Weblinks

Internal Phone Directory of ETH Zurich

www.ethz.ch/people/index EN

AMIV (Academic Association of Mechanical and Electrical Engineers, ETH)

www.amiv.ethz.ch

Woko Studentische Wohngenossenschaft

Sonneggstrasse 63, 8006 Zürich

www.woko.ch

Housing Office University Zurich and ETH Zurich

Sonneggstrasse 27, 8006 Zürich

www.wohnen.ethz.ch

Arbeitsvermittlung der Studentenschaft der Universität Zürich

www.arbeitsvermittlung.unizh.ch

Nightline Zürich

(Telephone hotline in the evening hours by students for students of Zurich University

and ETH Zurich, Mon-Fri: 20:00 - 24:00)

Phone: +41 44 633 77 77

E-Mail: info@nightline-zuerich.ch

www.nightline-zuerich.ch

ETH Zurich Ombusdsman (help and mediation in case of conflict)

(Confidential qualified help in case of serious difficulties, conflicts and personal crises) www.ombudsstelle.ethz.ch/index_EN

Psychological Counseling University Zurich and ETH Zurich

Phone: +41 44 634 22 80

E-Mail: pbs@ad.uzh.ch

www.pbs.uzh.ch/index en.html

7 Annex

7.1 Tutors

Name	Laboratory/Institute	Department	Location
Daraio Chiara	Chair in Mechanics and Materials	MAVT	CLA J19.2
Dual Jürg	Center of Mechanics	MAVT	CLA J23.2
Ensslin Klaus	Laboratory for Solid State Physics	PHYS	HPF E3
Hafner Christian	Electromagnetic Fields and Microwave	ITET	ETZ K90
	Electronics Laboratory		
Hierlemann	Bio Engineering Laboratory	BSSE	Basel: 8.54
Andreas			
Hierold Christofer	Micro and Nanosystems	MAVT	CLA H9
Ihn Thomas	Laboratory for Solid State Physics	PHYS	HPF C14
Koumoutsakos	Computational Science and Engineering	MAVT	CAB H69.2
Petros	Lab		
Nelson Bradley	Multi-Scale Robotics Lab	MAVT	CLA H15.2
Norris David	Optical Materials Engineering Laboratory	MAVT	CNB F122
Park Hyung Gyu	Nanoscience for Energy Technology and	MAVT	ML J12
	Sustainability		
Poulikakos Dimos	Laboratory of Thermodynamics in	MAVT	ML J36
	Emerging Technologies		
Pratsinis Sotiris E.	Particle Technology Laboratory	MAVT	ML F13.1
Tröster Gerhard	Electronics Laboratory	ITET	ETZ H89
Vörös Janos	Biosensors and Bioelectronics Lab	ITET	ETZ F82
Wood Vanessa	Integrated Systems Lab.	ITET	ETZ J86

7.2 Tutor Agreement



Department of Mechanical and Process Engineering

Agreement between	Master Tutor :	and Student – Master Curricul	um			
Last name	e	First name	Student ID	Student ID		
_	r: (HS/year; FS/	year)				
LE-Nr.	Course title		HS/FS	ECTS		
Core Courses (36 EC			113/1-3	2013		
Multidisciplinary Co.	urses (6 ECTS)					
Semester Project (8 ECTS)	Title		Supervi	sor		
Master Thesis (30 ECTS)	Title		Supervi	sor		
Date:						

D MAVT

ETH Zurich Department of Mechanical and Process Engineering Sonneggstrasse 3 8092 Zurich

www.mavt.ethz.ch

