Master
Master of Science ETH in Computer Science
Master’s Program in Computer Science

Computer Science is one of the most influential scientific fields of the 21st century. The Master’s program at ETH Zurich aims to fulfill the highest ambitions towards outstanding education in a city notable for its exceptional quality of life.

Comprehensive and individual Master’s program

The Master’s program aims to equip each individual student with advanced methodological and conceptual knowledge that goes beyond today’s technological developments and prepares students for scientific forerunner roles. Three major factors ensure the high quality of the ETH computer science degree: student selection, curriculum rigor, and close interaction with the department’s faculty. The program guides each student through a variety of fundamental and elective course offers, designing a profile fitting both personal inclinations and prospective career opportunities. Students can either choose general studies or one of several focus areas: Information Security, Software Engineering, Information Systems, Distributed Systems, Theoretical Computer Science, Visual Computing, and Computational Science.

ETH Zurich - excellence in research and teaching

ETH Zurich stands for highest educational standards, ground-breaking research, and applied results benefiting society as a whole. Since its foundation in 1855, the institution has believed and invested in long-term research. Ambitious to foster a vibrant intellectual community for its students, it continually strives to bring some of the world’s most talented and leading minds to Zurich. As a result, the institution regularly appears in international rankings as a top university. Currently, more than 450 professors maintain and build upon its excellent reputation and scientific proficiency. 21 Nobel laureates have studied, taught, or conducted research at ETH and Niklaus Wirth won the Turing Award for ETH.

Business and industry partnerships

The internationally diverse faculty of 30+ professors conducts cutting-edge research in a variety of fields and attracts business and industrial collaborations from around the world. Collaborators include influential global players in information technology such as IBM, Microsoft, Intel, SAP, Google, and Credit Suisse. The department also takes pride in the foundation of the Disney Research Zurich center at ETH, the only Disney research laboratory in Europe. A number of successful ETH spin-offs complete the picture.
Zurich and Switzerland
Zurich is Switzerland’s technological, economic and cultural center and one of the world’s leading business and financial hubs. Switzerland is well known for its political stability, safety and natural beauty. Amid a thriving environment, ETH Master’s students are offered diverse opportunities to grow and learn, both inside the institution and out. ETH is a first-rate place to study, develop, and explore.

Generalization or specialization?
The Master’s program combines theory and hands-on practice, providing students with a comprehensive education. Students are given the choice between two types of tracks catering to their personal as well as career interests. The General Computer Science track allows a combination of courses from different areas and grants flexible curriculum choice. Or, students choose a specialized track in preparation for a particular career route from the following fields:

**Theoretical Computer Science**
- Algorithms and data structures
- Combinatorial and geometric algorithms
- Randomized algorithms and probabilistic methods
- Complexity theory

**Information Security**
- Cryptographic systems, algorithms, and proofs
- Quality assurance methods for security-critical systems
- Vulnerability analysis
- Wireless network security

**Software Engineering**
- Programming languages and tools
- Parallel and high-performance computing
- Static and dynamic program analysis
- Software testing and verification

**Information Systems**
- Databases
- Cloud computing
- Big data, Web 2.0
- Information interaction
- Data stream processing

**Distributed Systems**
- Mobile computing, mobile devices
- Distributed data processing
- Architecture of enterprise data centers
- Multi-core architectures
- Distributed algorithms and network protocols
- Internet of things

**Visual Computing**
- Computer graphics
- Computer vision
- Geometric modeling
- Physically-based animation
- 3D modeling for images/video
- Digital geometry processing
- Image and video processing
- Display and multi-modal interaction technology

**Computational Science**
- Machine learning
- Multi-scale modeling and simulation
- High performance computing
- Scientific visualization
- Computational biology
- Bioinformatics
- Computational intelligence

Cultural as well as recreational facilities complement this dynamic atmosphere.

«Our graduates leave the institution with the expertise to make a significant impact in their professional fields and to sustain a competitive edge throughout their careers.»
Prof. Markus Püschel, Head of the Department

<table>
<thead>
<tr>
<th>Master of Science ETH in Computer Science 90 CP</th>
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<tbody>
<tr>
<td><strong>MASTER THESIS</strong>: 30 CP</td>
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<tr>
<td><strong>FOCUS COURSES IN COMPUTER SCIENCE</strong>: min. 26 CP</td>
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<td>choose 1 of 9 possible tracks:</td>
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<tr>
<td>- Theoretical Computer Science</td>
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<td>- Information Security</td>
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<td>- Software Engineering</td>
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<td>- Information Systems</td>
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<td>- Distributed Systems</td>
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<td>- Visual Computing</td>
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<td>- Computational Science</td>
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<td>- General Computer Science</td>
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<td><strong>INTER FOCUS COURSES COMPUTER SCIENCE</strong>: min. 12 CP</td>
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<td>Selection of CS topics of general importance</td>
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<td><strong>ELECTIVE COURSES COMPUTER SCIENCE</strong>: min. 8 CP</td>
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<td>Free choice out of a wide range of CS topics</td>
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<td><strong>ELECTIVE COURSES</strong>: min. 0 CP</td>
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<td>Optional multidisciplinary courses</td>
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<td><strong>GESS COURSES</strong>: min. 2 CP</td>
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<td>Humanities, Social and Political Sciences</td>
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