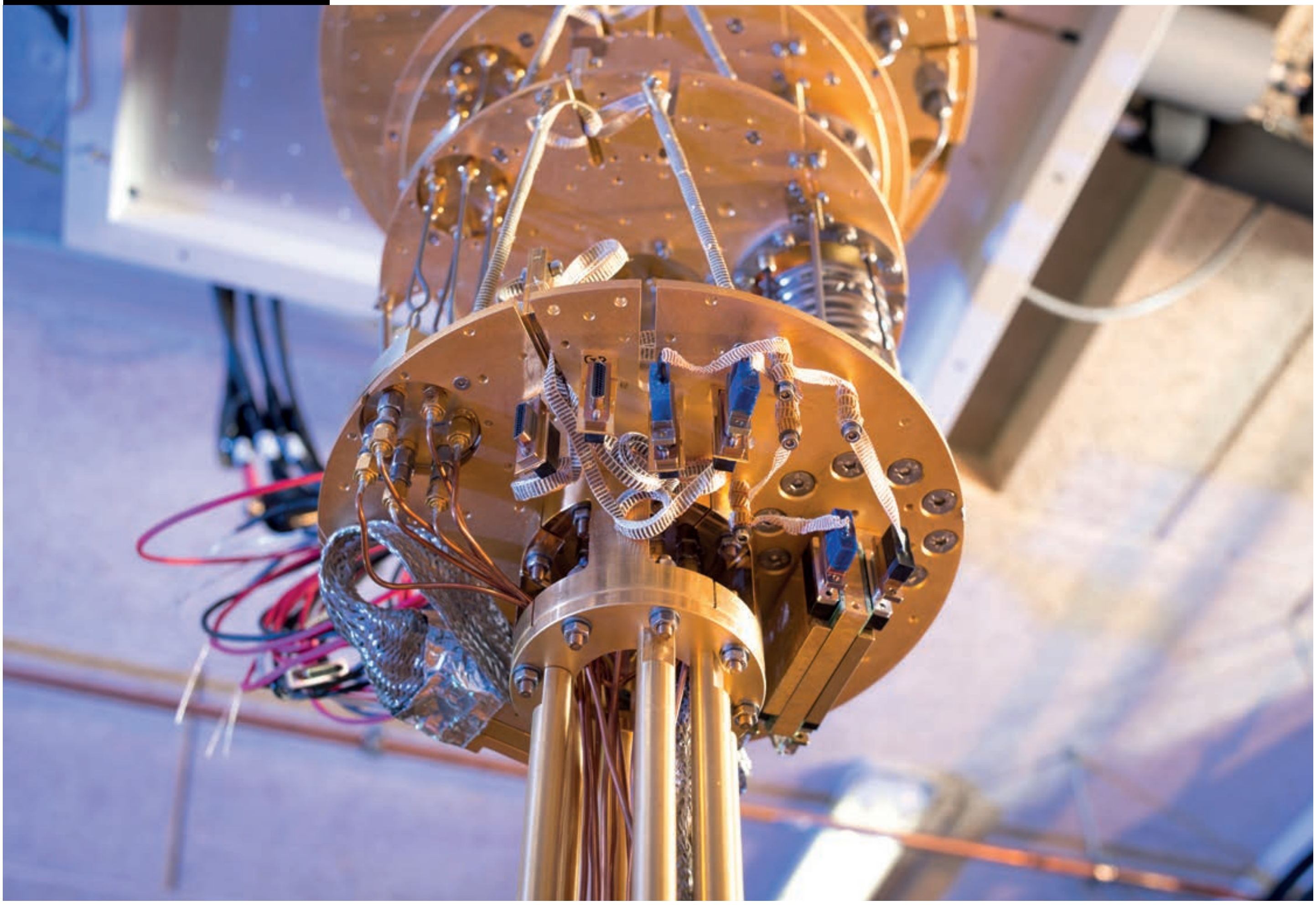
Computer Engineering

MSc Programme



Big data and cloud computing, multicore processors, heterogeneous accelerators, parallel computing are all emerging technologies that are crucial in many domains like the economic sectors, but also increasingly in the medical domain. The requirements of particular applications must be optimally supported, by selecting the right combination of hardware and software architectures for satisfying specific constraints with regard to performance, power and cost.

Degree	Master of Science
Starts	September
Type	full-time
Credits	120 ECTS, 24 months
Language	English
Application deadline	1 April 2019
Tuition fee	€ 18.750 (non-EU) € 2.083 (EU)
Scholarships	scholarships.tudelft.nl

The Computer Engineering programme is unique in providing a holistic view of system design. An in-depth understanding of hardware and software is necessary to provide the enabling technology for new societal trends such as ubiquitous online presence and the Internet of Things.

You will learn about modern computer architectures and networks and how to explain processors and their ability to perform their calculations, in addition to suggesting methods for optimising these calculations.

Programme

The Master of Science programme in Computer Engineering provides you with the skills that are needed in order to design, develop and use software and hardware for computer systems.

The courses in the programme address the three different aspects of computer engineering: software design, hardware design and the integration of the two. Understanding the theories that underlie system software will help you to create software designs. In addition, the

TU Delft

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<table>
<tr><th colspan="4">First Year (60 EC)</th></tr>
<tr><td>1st Quarter</td><td>2nd Quarter</td><td>3rd Quarter</td><td>4th Quarter</td></tr>
<tr><td colspan="2">Common core: Profile Orientation and Academic Skills (3 EC)</td><td colspan="2">Common core: System Engineering (3 EC)</td></tr>
<tr><td>Common core courses EE & CE (at least 1 out of 7, i.e. 5 EC)</td><td colspan="3" rowspan="2">CE Track core courses are: Modern Computer Architectures, Compiler Construction, Methods and Algorithms for System Design, Computer Arithmetic, Processor Design Project and Introduction to High Performance Computing</td></tr>
<tr><td>CE Track core courses (at least 4 out of 6, i.e. 20 EC)</td></tr>
<tr><td colspan="4">Specialisation courses (29 EC), e.g. High-Performance Data Networking, Electronics for Quantum Computation, Supercomputing for Big Data, Reconfigurable Computing Design, VLSI Systems on Chip, Digital IC Design, VLSI Test Technology & Reliability, Wireless Communications, Embedded Computer Architectures 2, Ad-hoc Networks, Deep Learning and Security & Cryptography.

+ Free elective courses (15 EC), e.g. homologation, internship, or non-technical courses.</td></tr>
<tr><th colspan="4">Second Year (60 EC)</th></tr>
<tr><td>1st Quarter</td><td>2nd Quarter</td><td>3rd Quarter</td><td>4th Quarter</td></tr>
<tr><td>Specialization courses</td><td colspan="3">Graduation project (45 EC)</td></tr>
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For more information on all courses, please visit: www.studyguide.tudelft.nl

Computer Engineering programme will prepare you for the engineering challenges that lie ahead.

Research Themes

There are five different research themes that drive many of the courses and that provide opportunities for a thesis project.

Quantum Computing is part of the QuTech research lab that aims to build a quantum gates based computer. We are looking at the different architectural design choices that depend on the underlying qubit technology, the encoding scheme chosen and the kind of logical qubit one wants to implement.

Big Data Architectures involves the design of cutting-edge high performance computing systems to address the current explosion of dataset sizes in a wide range of application domains.

Liquid Architectures involves the design of innovative reconfigurable processor architectures that change their characteristics dynamically based on the needs of the programmes they run.

Dependable Nano Computing is driven by technology scaling, globalization of IC supply chain and Internet of things, focuses on three topics: 1. Reliability (including modelling, monitoring, mitigation etc.) 2. Testability (including Fault Modeling and Design-for-Testability for 3D stacked ICs and emerging memories) 3. Hardware security (including PUF technology, secure design, etc).

In-Memory Computing targets the development, design and the demonstration of a new architecture paradigm for big data problems. This research is based on the integration of the storage and computation in the same physical location (using a crossbar topology) and the use of non-volatile resistive-switching technology, based on memristors, instead of CMOS technology.

Master's Thesis

The Master's thesis project can be chosen between the spectrum of hardware and software and can be performed at a company, in a research facility or at the university. Some examples of recent graduation projects are:

Examples of Master's Theses

- Acceleration of Cancer Diagnosis Algorithms on Super Computing FPGA Platforms
- GPU-Based Simulation of Brain Neuron Models
- Porting Linux to the rVEX Reconfigurable VLIW Softcore
- Hardware Acceleration of Shortread Mapping with the Burrows-Wheeler Aligner
- Interconnect Test for 3D Stacked Memories
- A Quantum Emulation Platform

58th
THE World University Rankings 2019

Career perspective

Companies
NXP, ASML, Philips, Apple, Intel, Google, IBM, Erasmus Medical Centre, China Telecom, Academic careers