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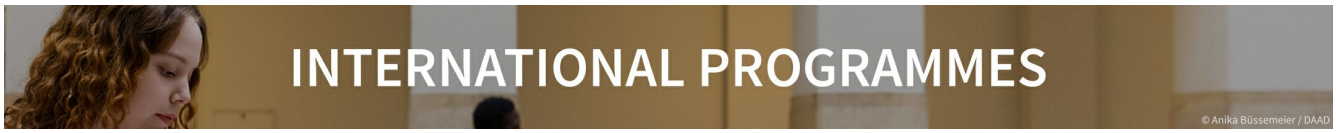


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# Master's degree

## Computer Science

University of Siegen • Siegen

## Overview

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| **Degree** | Master of Science |
| **Teaching language** | • English |
| **Languages** | All courses are taught in English. |
| **Programme duration** | 4 semesters |
| **Beginning** | Winter semester |
| **Application deadline** | https://www.master-cs.eti.uni-siegen.de/en/application<br><br>Non-EU applicants are advised to apply as early as possible, allowing for some delay to complete the visa process. |
| **Tuition fees per semester in EUR** | None |
| **Combined Master's degree / PhD programme** | No |
| **Joint degree / double degree programme** | No |
| **Description/content** | The study programme is a fully-fledged computer science Master's programme that conveys specific expertise in key areas of computer science including theoretical foundations, practical skills and knowledge about application areas. This includes the areas of software engineering, information systems, databases, machine learning, communication and security, algorithms and programming.<br><br>Students must select the study focus Visual Computing or Embedded Systems. As part of this study focus, embedded systems and visual computing students gain in-depth knowledge and can choose from a wide-ranging catalogue of modules. In addition, students acquire non-technical skills ranging from presentation techniques and team work to management and leadership skills.<br><br>(1) Visual Computing Study Focus<br>The term visual computing comprises all computer science disciplines handling images and 3D models, i.e. computer vision, computer graphics, image processing, machine learning, visualisation and virtual and augmented reality. Visual computing systems deal with one or more of the following aspects: acquisition, processing and analysis of visual information, e.g. in the form of images and videos, but also originating from medical image acquisition technologies, and rendering of visual information, e.g. the generation of images from visual or other data. Application areas include but are not restricted to quality control, medical image processing and visualisation, autonomous robotics, multimedia systems, film and television industries and computer games. |

(2) Embedded Systems Study Focus
The variety and number of embedded systems have grown significantly during the last years. This segment has become by far the most important one in the computer market with applications such as consumer electronics, industrial control and transportation systems. Transportation systems such as automotive electronics are of particular interest, because of stringent timing and dependability requirements that act as technology catalysts. The embedded systems market is expected to grow significantly over the next decade, and it is expected that many embedded systems will be connected to the Internet and form cyber-physical systems.

In both study foci, students benefit from the close collaboration between electrical engineering and computer science and a tight link to research projects conducted in both disciplines at the University of Siegen. For embedded systems, both disciplines contribute to courses on the specific knowledge including key areas such as hardware/software design, computer architectures, real-time systems, dependability, security, operating systems, modelling and application areas (e.g. automotive, industrial control). In the context of visual computing, the tight link to sensor development is an essential added value, including key areas like face detection, online range data processing with range cameras such as the Kinect, and multimodal pattern recognition.

The University of Siegen participates and leads research projects in healthcare, automotive, industrial control, avionics and home automation. Master's students are welcome to become involved in these projects (e.g. Master's thesis, student projects), and excellent students get the opportunity to pursue a PhD in one of these projects in Siegen.

# Course Details

**Course organisation**

The Master's programme Computer Science at the University of Siegen includes different types of modules.

Core modules convey a broad spectrum of relevant topics for computer science including theoretical, practical and technical computer science. Practical modules convey basic practical skills such as capabilities in software and hardware development as well as practical activities that are close to future occupational areas. The practical modules establish key qualifications that are required for team work in typical projects of the information technology industry.

Specialised modules convey profound scientific knowledge in the area of embedded systems or visual computing. Specialised modules can be chosen out of a comprehensive catalogue of modules. The specialised modules build on top of the core modules and focus on expertise in an area that is typically the foundation for the student projects and the Master's thesis.

The programme is structured as follows:

1. Four out of six core modules (6 CP each): Embedded Systems, Computer Architecture, Modelling and Animation, Parallel Processing, Algorithms, Advanced Logic

2. Practical and research oriented modules: Cutting Edge Research (6 CP), Scientific Working (including seminar, 9 CP), project work (15 CP)

3. Six specialised modules (6 CP each)

4. Master's thesis (30 CP)

For the study focus embedded systems, specialised modules are offered in several areas such as networked embedded systems, microelectronics, semiconductor technology, artificial intelligence, ubiquitous systems and real-time systems. Courses for networked embedded systems encompass modules about communication engineering and telematics. Students can also explore the development of embedded systems using FPGAs and state-of-the-art Systems-on-a-Chip (SoC). Another highlight of the programme includes courses in the area of small embedded computing units as part of ubiquitous systems that are equipped with basic processing and sensing modules, thus enabling them to detect, monitor, react on, and learn phenomena around them. Furthermore, knowledge in the area of artificial intelligence and deep learning will be conveyed, which can be deployed in embedded systems as part of student projects and Master's theses.

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| | The specialisation areas within the study focus visual computing are computer vision, computer graphics and machine learning. While these three sub-topics are highly interlinked, the Master's degree offers specific courses related to them. As these are advanced courses, students are expected to already have some basic knowledge related to image processing, computer graphics, and/or machine learning from their Bachelor's studies. Computer vision involves theoretical and algorithmic approaches to autonomously understand image and video data, presented in courses such as machine vision and convex optimisation. Computer graphics comprises methods for the generation of images from digital representations, including the generation and simulation of and the interaction with virtual environments, studied in courses like rendering, GPU programming, scientific visualisation and virtual reality. Machine learning deals with methods to train computers to perform a specific task on the basis of sample solutions. Statistic learning theory, deep learning, and recent advances in machine learning are related courses. |
| **Course-specific, integrated German language courses** | No |
| **Course-specific, integrated English language courses** | No |

## Costs / Funding

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| **Tuition fees per semester in EUR** | None |
| **Semester contribution** | Students have to pay a semester contribution of approximately 320 EUR, which is due before the start of each semester, as part of (re-)registration. This fee covers the cost of a public transport ticket (valid for six months in all of Germany), a social services contribution, and student activities. |
| **Costs of living** | The city of Siegen has very moderate costs for accommodation, offering attractive living conditions for students. Living expenses range from only 800 EUR to 950 EUR per month, including rent, health insurance, food, clothing, learning materials, phone/Internet, travel expenses, entertainment, and sports. This estimated cost of living can vary depending on lifestyle, type of accommodation, budget, and spending habits.<br><br>It is important that students plan and manage their finances throughout the duration of the degree programme to ensure they have enough funds to cover semester contributions and living costs. |
| **Funding opportunities within the university** | Yes |
| **Description of the above-mentioned funding opportunities within the university** | Students at the University of Siegen can apply for the 'Deutschlandstipendium / Studienförderfonds", which can cover part of the students' cost of living.Scholarships for doctoral students are available at the House of Young Talents of the University of Siegen. |

## Requirements / Registration

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| **Academic admission requirements** | Bachelor's degree in computer science or computer engineering. The responsible board of examiners will make the decision on the equivalence of degrees acquired at other higher education institutions or in other degree courses and on the suitability for the Master's programme. |

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| **Language requirements** | English language proficiency certificate: TOEFL iBT: min. 88 or IELTS: Band 6.5<br>The TOEFL code number for the University of Siegen is 8429. |
| **Application deadline** | https://www.master-cs.eti.uni-siegen.de/en/application<br><br>Non-EU applicants are advised to apply as early as possible, allowing for some delay to complete the visa process. |
| **Submit application to** | http://www.master-cs.eti.uni-siegen.de/ |

# Services

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| **Possibility of finding part-time employment** | Students can easily find part-time jobs with the help of thejob placement service of the university. Siegen and the surrounding area are home to a large number of medium-sized industrial enterprises (SMEs), or so-called hidden champions in electrical and mechanical engineering. Some bigger examples include the companies SMS and Achenbach Buschhütten. A lot of smaller, yet very successful and quickly growing high-tech companies are located here as well, for instance, PMD Technologies and Asentics, which are spin-off companies of the university. As a result, employment opportunities are very good, especially for jobs during the semester breaks and after graduation. |
| **Accommodation** | There are student residences (dormitories) of the"Studierendenwerk" (student services) close to the university. The rent for a room is between 270 EUR and 450 EUR. Please be aware that German universities do not usually have campus systems like universities in some other countries where all students can find accommodation directly on the university property. Therefore, some students might have to find rooms on their own. The private accommodation costs per room are 400 EUR on average. Detailed information concerning general accommodation can be found here.<br><br>Early application/search is advisable. |
| **Career advisory service** | The career services team helps with all questions regarding career entry and career planning. It offers information on occupational fields, helps with the career-related structuring of studies and provides direct support with individual coaching and consulting services when it comes to finding a good career start after graduation.<br><br>Furthermore, the programme SieguVer specifically supports international students in preparing for the regional job market. Additionally, the offers of the "Alumniverbund" provide a good opportunity to network and to benefit from the experiences of former students. |
| **Support for international students and doctoral candidates** | • Specialist counselling |

# Contact

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