

## Computer Science (B.Sc.)

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| Program of Study:         | Computer Science  |
| Department:               | Computer Science  |
| Degree Awarded:           | Bachelor of Science   |
| Form of Study:            | full-time undergraduate study on campus                       |
| Language of Teaching:     | German  |
| Commencement of Study:    | Fall trimester  |
| Standard Period of Study: | 3 years   |
| Academic Counseling:      | Department Chair of Computer Science                          |
| Homepage:                 | <a href="http://www.unibw.de/inf">http://www.unibw.de/inf</a> |

### I) Program Description

Computer Science deals with the systematic processing of information. To this end, computers can be used as tools, but this is not always necessary. Thus the focus is not limited to the construction of computers and how to work with them.

Computer Science addresses complex systems in which humans and/or machines interact on the basis of certain rules. Hence the methods of processing information in such systems are examined in the course of this program. It is essential for students of computer science to be able to understand, describe, and create formal models and simulations of these processes. One must be able to plan and construct the desired processes and rules such that information processing systems can then be developed. Such information processing systems can be single devices such as a personal computer, but can also be sophisticated infrastructures consisting of complicated networks of various devices, e.g. mobile phones, notebooks, GPS-receivers, and workstations.

The bachelor's program in Computer Science provides its students with the basic skills needed to set up devices and networks for information processing. Students are also taught the mathematical methods used to analyze and describe information processing and the typical methods employed in the development of systems for specific applications. More emphasis is placed on the abstract structures and methods than on concrete tools and technologies.

As an alternative, you may consider our program of study called "Mathematical Engineering". This course of studies places more emphasis on the application of computer science in the fields of electrical engineering, aerospace engineering, and civil engineering.

### II) Prerequisites

Ideally, candidates should have an excellent command of the German language as well as a good command of the English language (if possible, a higher level high school certification). Candidates should also hold higher level high school certifications in mathematics or computer science. Examples of mathematical knowledge required for this program of study are set theory, linear and quadratic equations, polynomials, logarithms, functions, root-finding algorithms, complex numbers, the binary numeral system, arithmetical and geometrical series, differential equations, definite and indefinite integrals, Euclidean geometry, analytic geometry, vector addition, scalar products, vector products, elementary logic, and probability.

### II) Preparing for Study

We recommend that new students refresh their knowledge of mathematics, and if needed, their English and computer skills (word processing, communication, system installation, and programming).

### **III) Abilities & Tendencies**

Special computer skills or knowledge of specific computer languages or operating systems may be helpful, but are not required. Students need not have taken a computer science class in high school either. The decisive requirement is the ability to think in an abstract and structured way. Students who enjoy mathematics, especially set theory and logic, are in an excellent position to begin this course of studies.

However, computer science also deals with the application-oriented construction of systems for specific users. Communication and presentation skills are thus additionally required so that one can develop an appropriate system based on the users' goals and wishes. Social, psychological, economical, and political requirements and effects of the systems must be considered. Finally, command of English and the ability to work in a team are crucial characteristics in the field of computer science. Students rarely possess all of these qualities at the outset of their studies. One must also realize that computer science is constantly changing. Hence, it is essential that one be prepared to deal with new topics and challenges and to adapt accordingly.

### **IV) Structure of the Program**

The first year of study consists in a general introduction to computer science with an emphasis on software development. Working in small groups on a programming project at the beginning of the second year, the students' skills acquired in the first year are implemented and put to the test. Following this stage, students attend required modules dealing with various aspects of software and computer systems. These aspects are complemented with basic theoretical (mathematical and electro-technical) aspects. From the second year on, students are free to attend modules of their choice on topics such as IT security, simulation, or artificial intelligence. The third year is set aside for an internship and a special seminar. With regard to applications of computer science, the students (from the second year on) choose between two application-oriented subjects: "Electrical Engineering" or "Mathematics and Applied Systems". Three months are allotted for the final project at the end of the third year.

### **V) Careers**

Graduates in the field of computer science are prepared for a variety of careers. In practice they deal with conception, planning, realization, modification, and maintenance of systems for information processing and transfer. Thus they may work with weapons systems, tracking systems, multimedia communication systems, control systems for machines, industrial facilities, traffic systems, or with telecommunication systems, just to name a few. With respect to small devices, the spectrum of jobs open to Computer Science graduates continues to grow: mobile phones, wristwatches, mobile computers, and medical technology are all things that are becoming more and more flexible and powerful, securer and user-friendlier by the day. Examples of occupations are

- developing new systems for data processing
- introducing and updating information technologies
- service, maintenance, or distribution of products in the computer industry
- a career at an educational institution, including research and teaching

### **VI) Further Information**

For more information on study at the Universität der Bundeswehr München and the application process, please visit [www.unibw.de/studienberatung](http://www.unibw.de/studienberatung). As a student at the Universität der Bundeswehr München, you can also complete a portion of your studies abroad. You will find information on our exchange programs and partner universities at [www.unibw.de/auslandsbuero](http://www.unibw.de/auslandsbuero).