

Types of Computer Science Degrees

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Computer science is the scientific, practical, and theoretical approach to computation using computers.

As problem solvers, computer scientists and professionals use their unique understanding of computers and computation processes to design computational systems with real-world and theoretical applications.

Computer and information scientists are needed across multiple areas of employment, including, science, medicine, government, education, and business. They employ advanced modeling and use computers to analyze problems and design solutions. Computer science requires the ability to think logically, but good computer scientists are also very creative.

Within the discipline of computer science, there are several sub-disciplines of both a practical and theoretical nature. Computer science disciplines and specialties can be abstract (e.g. computational complexity theory), practical (e.g. computer graphics) or a combination of the two (e.g. programming language theory).

The more practical applications of computer science can be seen in just about every facet of today's computer driven world. Some of the more important disciplines within computer science include software engineering, application development, artificial intelligence, computer networking, computer-human interaction, computer graphics, computer architecture, operating systems, numerical and symbolic computation, database systems and computational science.

Computer science is one of the few disciplines that includes experimental methods, engineering design and theoretical studies. This is very different from most other fields of science that tend to separate the understanding of science from its application in real-world engineering settings. In computer science the theoretical concepts of computation are intermingled with modern practical advancements in electronics and engineering technology which in turn help to advance the discipline.

Areas of Computer Science

The discipline of computer science covers a large array of topics from the theoretical studies of limits of computations and algorithms to more practical applications such as the development and implementation of computer and software driven computing systems. There are however four areas that, according to the *Computing Sciences Accreditation Board* (CSAB), are integral to the study, understanding and advancement of computer science: *theory of computation, data structures and algorithms, computer elements and architecture, and programming languages and methodology*. Within the discipline of computer science there are two general categories: Theoretical Computer Science and Applied Computer Science. The following is a breakdown of the different specialties within each area of focus.

Applied Computer Science

- Artificial Intelligence
- Computer Architecture and Engineering
- Computer Graphics and Visualization
- Computer Security and Cryptography
- Computational Science
- Computer Networks
- Databases and Information Retrieval
- Health Informatics
- Information Science
- Software Engineering
- Concurrent, Parallel and Distributed Systems

Theoretical Computer Science

- Theory of Computation
- Information and Coding Theory
- Algorithms and Data Structures
- Programming Language Theory
- Formal Methods

Education

Many colleges, universities and vocational schools take a very different approach to teaching computer science. While theory is an important aspect of program curriculum, emphasis is placed on teaching computer science and advanced programming as they apply in a real-world setting. These programs are designed to help students develop practical, applicable skills that they'll need to enter the work force, particularly the software industry as software engineers. While many in academia may disagree, there is a strong

consensus among professionals in high-tech industries that education programs that emphasize applied computer science provide students with a more valuable education than those that focus primarily on theory.

Bachelor's Degree in Computer Science

A bachelor's degree in computer science typically takes about four years to complete. In fact, there are many different types of bachelor's degrees in computer science:

- Bachelor of Arts (BA) in Computer Science
- Bachelor of Applied Science (BASc) in Computer Science
- Bachelor of Computer Security in Computer Science
- Bachelor of Computing in Computer Science
- Bachelor of Engineering (BEng) in Computer Science
- Bachelor of Science in Engineering (Computer Science) – BSE (CS)
- Bachelor of Mathematics in Computer Science
- Bachelor of Science (BSc or BS) in Computer Science
- Bachelor of Science in Information Technology

Some of the more common topics addressed in a bachelor's degree in computer science program include Algorithms, Programming Paradigms, Data Structures and Information Retrieval, Programming Principles, Computer Architecture and Logic & Computation. More in-depth courses, usually associated with a specialized discipline within a computer science, include human-computer interaction, information theory, data communication, theory of computation, numerical computation, operating systems, compilers, computer graphics, cyber-security, game design, information assurance, distributed systems and artificial intelligence, among others.