

Preparing for a Career in the Computer Industry

To prepare for a career in the computer industry, you first must decide on the area in which you are interested and then become educated in that field. If you desire a formal education, several options are available, which include attending a trade school, a college that offers two-year degrees, or a college or university that offers four-year degrees. Some classes are held on campus; others are offered online. After obtaining your education, you must remain current with changes in the field. The following sections discuss various options for obtaining formal computer education and methods of remaining current after embarking on a career in the computer industry.

Attending a Trade School

A **trade school**, also called a technical school, vocational school, or career college, offers programs primarily in the areas of programming, Web design and development, graphics design, hardware maintenance, networking, personal computer support, and security. One advantage of attending a trade school is time savings. Trade schools teach specific skills instead of requiring students take a broad range of courses in the sciences and humanities. For this reason, students often complete trade school programs in a shorter time than college and university programs.

Upon completion of trade school education, students often receive a certificate. Some receive an associate's degree or higher. Many students seek full-time employment with their certificate or degree and then continue their education on a part-time basis with a two-year or four-year college. To ensure coursework will transfer, it is important that students ask their advisor if the trade school has an

articulation agreement with a nearby college or university. An *articulation agreement* ensures that if you transfer to a college or university, you will receive credit for most of the courses taken at your current school.

As with any post-secondary school, when deciding on a trade school, you should compare curricula, laboratory facilities, instructors, and the types of jobs the school's graduates have obtained.

Entry-level jobs for students with a certificate or degree from a trade school include computer technician, desktop publisher/compositor, graphic designer/illustrator, help desk specialist, technical writer, and Web developer.

Attending a College or University

Some students attend a two-year school, called a community college or junior college. Others attend a four-year college or university. If attending a community college, students should ask their advisor if the school has an articulation agreement with a nearby college or university. As in most other industries, individuals with advanced degrees in specific fields have a better chance of success. To round out their education, many graduates augment their computer degree with a master's degree in business, education, or other field of study. Read Innovative Computing 15-1 to find out about one school that offers its course content free of charge.

At colleges and universities, three broad disciplines produce the majority of entry-level employees in the computer industry: computer information systems, computer science, and computer engineering. Another program sometimes offered is software engineering, whose definition varies depending on the school, which may combine characteristics from each of these disciplines. The characteristics of each program are summarized in Figure 15-8 and discussed in the following paragraphs.

Trade Schools

For more information, visit scsite.com/dc2011/ch15/weblink and then click Trade Schools.

INNOVATIVE COMPUTING 15-1

College Course Content Available Online

Whether you want to learn a new foreign language, brush up on your grammar, or study art history, you can find an online course that fits your interests. Teaching materials for thousands of colleges and universities are available free of charge on the Web.

Massachusetts Institute of Technology has one of the leading educational Web sites. More than 90 percent of its faculty and 2,600 community members have

been contributing course material to the university's OpenCourseWare (OCW) project since 2001. Currently, the lecture notes, tests, and videos for more than 1,900 undergraduate- and graduate-level classes are available. No registration is required.

The more popular courses are in the areas of computer science, physics, electronics, and mathematics. Much of the OCW material has been translated into foreign languages, including Chinese, Spanish, Portuguese, and



Thai. Paper copies of the course content are available to students in sub-Saharan regions without high bandwidth.

 For more information, visit scsite.com/dc2011/ch15/innovative and then click OCW.

Computer Discipline Differences

Computer Information Systems*	Computer Science	Computer Engineering
Practical and application oriented	Theory oriented	Design oriented
Business and management oriented	Mathematics and science oriented	Mathematics and science oriented
Understand how to design and implement information systems	Understand the fundamental nature of hardware and software	Understand the fundamental nature of hardware and electronics
Certificates Degrees include A.A., A.A.S., A.S., B.A., B.S., M.S., Ph.D.	Degrees include B.S., M.S., Ph.D.	Degrees include B.S., M.S., Ph.D.

*Sometimes called Information Technology or Management Information Systems

Figure 15-8 The major differences among the computer information systems, computer science, and computer engineering disciplines.

Major in Computer Information Systems

A **computer information systems (CIS)**, or information technology (IT), curriculum teaches students technical knowledge and skills and focuses on how to apply these skills. Types of computer courses required in a typical CIS curriculum emphasize application programming and include courses in programming, operating systems, systems analysis and design, databases, networking, and Web development. CIS curricula typically do not require majors to have a strong mathematics or physics background. In addition to academic skills, CIS majors should possess excellent people skills, a keen understanding of business operations and organizational behavior, the ability to work in teams, and solid presentation skills.

After two years of study in a CIS curriculum, students may receive an associate's degree or certificate. Entry-level jobs for students with a two-year CIS degree include desktop or mobile application programmer/developer, computer operator, computer sales representative, computer technician, graphic designer/illustrator, help desk specialist, and technical writer.

Students enrolled in four-year programs can receive a bachelor's degree with an emphasis in software development, systems analysis and design, or networking. Entry-level jobs for CIS students graduating with a bachelor's degree include desktop or mobile application programmer, computer security specialist/mobile security specialist, database analyst, e-commerce director, graphic designer/illustrator, IT consultant, network security administrator, storage administrator/analyst, systems analyst, and Web software developer.

Instead of CIS, some schools refer to this curriculum as *management information systems (MIS)* or *management information technology*. The main

difference between a CIS curriculum and an MIS curriculum is that the ratio of business courses to computer courses is greater in an MIS curriculum.

Major in Computer Science A **computer science (CS)** curriculum focuses on the theory of programming and operating systems. A computer science curriculum typically emphasizes systems programming instead of application programming. CS computer courses typically include subjects such as artificial intelligence, data communications, data and file structures, operating systems, application and systems programming, and systems analysis and design. Students also are required to take higher-level mathematics, such as calculus, and physics courses in the CS curriculum.

Entry-level jobs for graduating CS students include software engineer, storage administrator/analyst, systems programmer, digital forensics examiner, and IT consultant.

Major in Computer Engineering A **computer engineering (CE)** curriculum teaches students how to design and develop the electronic components found in computers and peripheral devices. Required computer courses include application and systems programming, data and file structures, networks, and operating systems. Students also are required to take several high-level mathematics courses, at least two semesters of physics, and several electrical engineering courses in the CE curriculum.

Entry-level jobs for graduating CE students include software engineer, network security administrator, computer hardware designer, new hardware tester, and IT consultant. Computer engineers work independently or with teams of other engineers.

 **Computer Degrees**

For more information, visit scsite.com/dc2011/ch15/weblink and then click Computer Degrees.