TRENDS FOR ENGINEERING TECHNOLOGIES

Overview

General engineering related occupations are predicted to show good to moderate growth in the next decade. Wages for these occupations are the fourth highest of the twenty-two SOC (Standard Occupational Classification) major groups. The three primary trends within the area of engineering are: 1) the changing culture of the workplace; 2) new and higher expectations related to workers "soft" and technical skills and; 3) the rapid changes in technology in virtually all areas.

Information Technology Engineering, more specifically computer and network engineering technology, has been one of the fastest-growing sectors of both the U.S. and North Carolina's economy. Industry experts and government labor forecasters anticipate that the demand for IT professionals and other high tech workers will continue to expand during the next few years.

General Engineering

There are approximately 62,500 engineering and architectural workers in North Carolina earning a mean salary of $46,620 per year.

- New technology will continue to transform the way we live and work. The demand for scientists, engineers, and technicians will continue to grow.
- The engineering, technology and health industries will grow rapidly and many new biotechnology jobs will open up.

Information Technology Engineering

IT engineering workers may be defined as those engaged in the creation, development and implementation of computer technology. These workers fit within four different pathways, as identified by the U.S Departments of Education and Labor:

- **Information Support & Services –** Including tech support or help desk specialists, technical writers, database developers and administrators, and systems analysts. ITAA forecasts more than 420,000 new jobs in this pathway for 2001, almost three-quarters of them in non-IT firms. Industry credentialing suitable for high school programs includes CompTIA's A+ certification.
- **Network Systems –** Including Information Systems administrators, network technicians and network administrators. ITAA forecasts more than 186,000 new jobs in this pathway, the vast majority of them in non-IT companies. Industry credentialing suitable for high school programs includes CompTIA's Net+ certification, as well as Cisco Certified Network Associate (CCNA), Microsoft Certified Professional (MCP), or Novell Certified Network Administrator (C-NA).
- **Programming & Software Development –** Including programmers, systems analysts, applications engineers, and numerous other job titles. ITAA forecasts more than 135,000 new jobs in this pathway in 2001, more than half of them in non-IT companies.
- **Interactive Media –** Including web designers, webmasters, virtual reality specialists, multimedia producers, and digital media specialists. ITAA forecasts 12,000 new jobs in this field in 2001.

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The Workplace

Over the next ten years the workplace will continue to rapidly employ emerging technology and integrate enterprise-wide information systems. Employees will be expected to use TQM skills while maintaining high skill levels within their areas of expertise.

- Industry will adopt new production technologies as rapidly as they can be developed..
- By 2005, artificial intelligence, data mining, and virtual reality will help most companies and government agencies to assimilate data and solve problems beyond the range of today's computers.
- The half-life of an engineer's knowledge today is only five years.
- Low-wage countries such as China will (continue to) take low-wage jobs from advanced industrialized countries such as the United States.
- Information now flows from front-line workers to higher management for analysis.

The Skills

"The next generation of engineers should have a foundation of knowledge in communication skills, computing and information systems, database interaction, computer programming, project management, standards, interactive/collaborative technologies, TQM, problem solving and visualization." (R.R. Cumberland and Craig L. Miller – Purdue University.)

- Virtually all workers must possess a basic literacy in science and technology in order to compete in today's marketplace.
- Workers will be expected to use new tools to analyze, synthesize, and organize data.
- Workers will be expected to collaborate with others, work in teams, sift through proliferating volumes of often conflicting information, engage in both critical thinking, and use a vast array of technological tools.
- Today, all engineers must possess skills in scientific visualization technologies.
- Within engineering, constraint-based or parametric-based solid modeling skills are essential.
- Future IT workers will need highly specialized technical knowledge, but will also need foundational understanding of computer technology.
- Surveys of industry representatives indicate that workplace skills such as communications, teamwork and troubleshooting problems are also key factors in the success or failure of new hires.

Changes in Technology

Changes in technology will continue at an exponential rate. In order to stay competitive, businesses will need to stay agile (employ new technology, upgrade employee skills, and adapt new strategies for human and technical resources rapidly).

- "Computer technology and specifically 3-D solid modeling CAD (computer aided design) technology has significantly altered the way in which products are designed from 'art to part'." (Miller)
- "…many industries around the world have adopted a team-orientated concurrent approach using 3D CAD databases and other new technologies." (Miller)

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Changes in Technology

- By 2005 IBM announced it will have an operation teraflop supercomputer (one trillion operations a second) – approaching the capabilities of the human mind in complex information processing…
- By 2005 … many high school books will be tied to Internet sites that provide source material, study exercises, … to aid in learning. Ref. 2.
- Because of explosive growth in computer and network engineering technology, by 2008 a net increase of 117% in the computer and data processing industry is predicted
- With the growth of the Internet and Intranets, which link people and computers within an organization, and the expansion of electronic commerce, some service companies specialize in developing and maintaining Web sites and corporate Intranets for client companies