# Critical Skill Shortages Project:
# An Assessment of Root Causes for Skill Shortages in the Wireless Industry in Greater Austin

## A Report for
## *Work*Source – Greater Austin
## Area Workforce Board

**A Research Initiative of *Work*Source-Greater Austin Area Workforce Board**

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# Introduction

The overall aim of the Critical Skill Shortages Project is to better align the workforce development system with economic development efforts in Austin.

Both Austin and the State of Texas have pursued a cluster-based approach to economic development. In 2004, the Greater Austin Chamber of Commerce (GACC) raised $13 million through its "Opportunity Austin" campaign to finance a five-year economic development effort targeting nine industry clusters:

1. Automotive Manufacturing

2. Biosciences, including biomedical, and pharmaceutical products

3. Product Manufacturing

4. Wireless Technology

5. Transportation and Logistics

6. Computer Software

7. Clean Energy

8. Semiconductors

9. Digital Media

In a previous report, we assessed the nine industry clusters targeted by the GACC according to their labor market suitability and their potential for industry engagement. On the basis of this assessment, we chose two industry clusters for further work: biosciences/biomedical /pharmaceutical products and wireless technology. Both clusters are emerging industries, populated by small firms, and characterized by fast changing technologies. In each of these clusters, about 100 firms are located in the Greater Austin area. Both clusters hold promise for significant development in Austin.

After securing agreement from our *Work*Source Board advisors, we conducted further investigations of the biosciences and wireless technology clusters. This report summarizes our findings on the labor market in wireless technology in Austin.

**Framing the Issues**

We start by briefly attempting to frame the issues within which we are examining occupational skill shortages in these clusters.

Shortages, in one way or another, can all be traced to problems in at least one of three areas:

> ***Training "fit"*** is the match between employer needs and available training, in terms of the content of the training. This may include the correct knowledge base, the right skills taught, or even the way the training is provided. In several cases, employers cited insufficient applied knowledge or experience with hands-on skills.

> ***Training capacity*** describes whether there are enough training slots available to meet the needs. Training capacity may include slots in 4-year colleges, 2-year

colleges, trade schools and programs, continuing education classes, customized training, and even a company's own capacity to provide in-house training and on-the-job training.

*Training utilization* relates to the question "If we build it, will they come?"  In some cases, employers may consider the training to be good, and there are sufficient training slots, but the program does not attract enough qualified applicants, or those applicants who enter training do not complete the program and thus do not gain the skills needed for the jobs.

Within each of these areas, there are different types of associated root causes.  Problems with training fit may stem from communication and feedback mechanisms between industry and the workforce development community that are either missing or misconnecting, information links may lack clarity, or workforce developers must adhere to program guidelines or requirements that do not match the needs of employers.  Problems with training capacity may be based on a shortage of instructors or facilities due to competing demands for those resources.  Problems with training utilization may be caused by a combination of factors, including insufficient information about the employment opportunities or the training available, negative perceptions about the jobs or the training, insufficient wages or incentives to attract trainees, or barriers to entry or to complete the training, such as problems with training schedules, child care or transportation that preclude participation of applicants in the training.

There are also several larger conceptual considerations that merit attention.

First, there appears to be an inherent clash of cultures between economic and workforce development practitioners.  Economic development tends to put its faith in markets' ability to work out the details after an initial assist through public sector incentives or outreach.  The concerns that occupy workforce development—including which occupations might be critical for a given cluster to flourish, how local residents might best be prepared for these jobs, how long the process of preparing the workforce might take, and where the financing for it might come from—are found in these "details."  Effective and timely preparation of local residents often requires considerable planning and investment of public and private resources.  A "market approach" may take years to accomplish, during which time local residents will not be prepared for jobs, so companies will incur added costs to recruit out-of-town candidates.

Second, the underlying assumption of the Critical Skills Project may or may not hold up in practice.  The assumption is that the regional success of these clusters depends on effectively addressing current or projected critical skill shortages that are operating as barriers to further growth.  However, there may well be other more immediate 'root causes' that serve to constrain these clusters, ones that are as critical to success as skill shortages.  A prime example of this is Michael Dell's announcement several years ago that infrastructure inadequacies, specifically Austin's underdeveloped set of roads, and not shortages of workers with the appropriate skills or work attitudes, had led Dell Computer to limit its growth in Central Texas and direct it to its plants in Tennessee, Ireland and Asia.  Addressing such problems may well be at least as important for the success of these clusters in the region as skill shortages and may require the collective efforts of a wider array of decision-makers in the private sector and several levels of government as well.

A third and closely related issue is that labor market processes are increasingly non-linear.  Labor economists once could clearly articulate the "career ladders" that workers could use to advance within a given employer or industry if they obtained the requisite education, skills and experience.  In today's labor markets, this is no longer the case.  Several as yet imperfect metaphors are emerging to describe and understand the way labor markets work.  Two such metaphors—the "career lattice" and the "climbing wall"[1]—suggest that progression may require some sideways or even downward movement for workers at times as they navigate today's labor markets.  This implies that there may also be related non-linear "work-arounds" for potential skill shortages, such as skill training at the community college level for graduates of 4-year colleges who have the knowledge but not the skills or experience in applying their knowledge.

To the extent that skill shortages act as a barrier to further growth in the targeted clusters, it is far more likely in industry clusters where the preparation process for highly skilled professional and technical workers is much longer and more elaborate.  Biosciences generally fit this mold much more so than Wireless.  In Biosciences, large shares of the workforce will necessarily require college academic training, some of it at the postgraduate level, while most of the key workers in Wireless may only need industry experience or technical certification.  We presume that both the root causes and the associated solutions to any identified skill shortages in these clusters will look quite different.

**Cluster-driven Economic Development**

Regional economies are composed of three main types of activities: natural resources clusters, local clusters, and traded clusters.  Natural Resource Clusters are found in regions where a particular natural resource is abundant.  Local clusters are found in every region and produce goods and services that are needed by the local population, e.g. retail trade, or hospitals and medical facilities that serve the local population.  Traded clusters in a region produce goods and services that are in competition with other regions and nations.  They trade across the nation and the globe (e.g. automotive parts, medical devices).  These clusters tend to be concentrated only in a few regions.

Traded clusters drive regional prosperity.  While local clusters account for roughly two-thirds of employment in an average region, traded clusters heavily drive the prosperity and growth of a region.  This is because traded clusters can achieve higher productivity, their growth is unconstrained by the size of the local markets, and their success creates much of the demand for local clusters.  Thus our primary interest in this study is traded clusters.

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[1] For more on this topic, see: David W. Stevens, "Welfare to Work Policy," Baltimore, MD: The Jacob France Institute, University of Baltimore, July 2001.  This is a revised version of a paper presented to *America's Workforce Network Research Conference* in Washington, D.C. on June 27, 2001.

# The Wireless Cluster: What is Wireless?

The wireless cluster is emerging, technically challenging, rapidly changing, and populated by many newly established small firms.  The wireless cluster includes numerous categories and components, many of which overlap with Advanced Technology and Manufacturing, Computer Software and/or Digital Media Clusters, which the Greater Austin Chamber of Commerce is also targeting.  These components include hardware development and manufacturing, software development, semiconductor chip design, and a variety of uses and applications, which vary according to bandwidth and radio frequency spectrum allocations.  As Erin Defossé, Executive Director of the Austin Wireless Alliance, explained: "Stripped to its essentials, wireless is no more than semiconductor chips that send radio signals together with 'way cool' software."[2]

# Wireless in Austin

## The Industry and Economic Development

The GACC specifically targets Wireless Technology but considers the cluster to include elements of telecom, computer software related to wireless, and digital media related to the emerging visual technology for camera phones and other wireless devices.  The focus includes the major wireless phone carriers and their network of suppliers as well as wireless Internet services provided by a number of Austin companies such as Wayport and Alereon.

An $IC^2$ Institute study identified 91 wireless firms in Austin in 2003.  Among the wireless companies with 100 or fewer employees were approximately 3,400 employees.  This number was expected to double to nearly 8,000 employees by 2008 ($IC^2$ Institute, January 2004).  Among 39 firms responding to a survey made for the $IC^2$ study, fully 80 percent anticipated hiring additional staff within the next year.  Only 2 firms out of the 39 did not anticipate hiring within the next five years.

In its economic development initiatives, Texas focuses on wireless technology.  Texas targets Wireless Technology specifically through the State Strategy on Advanced Technology (SSAT), and wireless technology is also targeted in the Texas Industry Cluster Initiative as part of the broader category entitled "Computer and Information Technology."

Austin's strengths in wireless are significant.  The area has all the ingredients to build a significant cluster in wireless.  Austin has the strongest semiconductor industry cluster in the nation.  Austin also has significant software capabilities.  The University of Texas Wireless Networking and Communications Group is world-renowned for its research in wireless.  In addition, there is a considerable amount of research underway in the private sector, including SBC Laboratories and IBM and a wide variety of smaller firms.  IBM's Solutions Laboratory, a research and development facility that prototypes and develops proof of concept (i.e., proof that an idea actually works) in a variety of wireless applications for home, office and automobiles, is located in Austin.  In addition, thanks in part to the efforts of organizations such as Austin Free-net and the Austin Wireless City Project, Austin ranks third on Intel's annual listing of most unwired cities in the nation.[3]  Austin is home to the major standards and certification organization for wireless devices, the Wi-Fi Alliance, formed in 1999 to certify the interoperability of IEEE 802.11 products and promote them as a global wireless local area network (LAN) standard.  Austin is also known for its

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[2] Interview with Erin Defossé, Executive Director, Austin Wireless Alliance, July 8, 2005.
[3] Available on the internet at http://www.intel.com/personal/wireless/unwiredcities/  Accessed August 1, 2005.

entrepreneurial environment that fosters the development of new businesses, especially in information technology.

Austin is attracting more venture capital. The *Austin American-Statesman* reported that Square 1 Bank, a venture bank based in Research Triangle Park, N.C., plans to begin operations in Austin on August 8.[4] The Austin Technology Incubator has established a special unit devoted to wireless technology. It seeks to connect early-stage startups with investors, partners, suppliers, and customers.

Table 1 displays the available information on Location Quotients (LQs) for Travis County in industry classifications related to the wireless technology cluster. Unfortunately, due to unavoidably missing information, it shows only a partial picture. Austin's Location Quotient (LQ) for semiconductors and related device manufacturing is extraordinarily high at 14.47, meaning that Travis County has more than 14 times the national average concentration of employment in semiconductors. Other industries show strength ranging from 1 to just over 2, indicating employment concentrations of up to more than twice the national average. Only the category "communication equipment repair" is below the national average.

### Table 1: Location Quotients calculated from Quarterly Census of Employment and Wage Data (2004)

| Industry | Travis County, Texas |
|---|---|
| Base Industry: Total, all industries | 1.00 |
| NAICS 334220 Broadcast and wireless communications equip. | ND |
| NAICS 334290 Other communications equipment manufacturing | ND |
| NAICS 334413 Semiconductors and related device mfg. | 14.47 |
| NAICS 443112 Radio, TV, and other electronics stores | 1.23 |
| NAICS 515 Broadcasting, except Internet | 2.10 |
| NAICS 516 Internet publishing and broadcasting | 1.78 |
| NAICS 5172 Wireless telecommunications carriers | 2.07 |
| NAICS 5173 Telecommunications resellers | 1.05 |
| NAICS 5174 Satellite telecommunications | ND |
| NAICS 5175 Cable and other program distribution | ND |
| NAICS 5179 Other telecommunications | NC |
| NAICS 811213 Communication equipment repair | 0.69 |
| Footnotes: (ND) Not Disclosable (NC) Not Calculable, the data does not exist or it is zero | |
| Location Quotient: Ratio of analysis-industry employment in the analysis area to base-industry employment in the analysis area divided by the ratio of analysis-industry employment in the base area to base-industry employment in the base area. | |

Within the Greater Austin area, a variety of businesses are working across the entire wireless landscape—over the entire radio frequency spectrum and in nearly every segment of the value chain, from design and production of chips through providing services.[5]

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[4] *Laurie Parks,* "A new bank for tech startups: Square 1 will compete with Silicon Valley Bank and Comerica for Austin-area startups," *Austin American-Statesman (August 5, 2005).*

[5] See Ed Acosta, "Austin's Wireless Landscape." Presentation to the Austin Technology Council, Texas Executive Summit 2004

**Workforce Development – Education and Training**

The wireless cluster has occupations and skill development needs that are well suited for strategic intervention by the workforce system. Technicians are needed, as are approaches to upgrade the skills of individuals who have learned to manage wired networks so that they can install, troubleshoot, or manage wireless networks.  Twenty-six of the 132 jobs (20%) in wireless field posted on Monster.com in July 2005 require an associate's degree or high school diploma and/or relevant experience (see Appendix B).

From a workforce development perspective, what background and preparation is appropriate for workers in wireless technology?  Is it engineering?  Electronics?  Computer Science?  Computer networking?  Or some combination?  Is wireless an overlay, or a focus in and of itself?

### *University-Level Preparation*

At the university level, Wireless generally means engineering.  The key department at the University of Texas at Austin is Electrical Engineering, which has experienced increasing student enrollment over the past four years (see Table 2).  All graduate students in this Department major in Electrical and Computer Engineering.  The Department is home to the Wireless Networking and Communications Group, a world-renowned research facility in wireless technology which works with several dozen graduate students.  The Computer Science Department in the College of Natural Sciences also has a strong student enrollment.  The School of Information (formerly Graduate School of Library and Information Science) also produces graduates with an interest in the field of information technology.

### Table 2:  Statistics on Student Population at University of Texas, Austin

| College/Department/Major | Degree Conferred | 1999-2000 | 2000-2001 | 2001-2002 | 2002-2003 | 2003-2004 |
|---|---|---|---|---|---|---|
| **ENGINEERING** | | | | | | |
| Electrical Engineering | B | 257 | 285 | 301 | 334 | 376 |
| Electrical and Computer Engineering (1) | M | 138 | 122 | 143 | 114 | 162 |
| | D | 49 | 46 | 32 | 51 | 53 |
| | **Total** | **444** | **453** | **476** | **499** | **591** |
| **INFORMATION** (2) | M | 145 | 138 | 113 | 100 | 105 |
| | D | 8 | 3 | 1 | 2 | 5 |
| | **Total** | **153** | **141** | **114** | **102** | **110** |
| **NATURAL SCIENCES** | | | | | | |
| Computer Science | B | 265 | 281 | 355 | 410 | 348 |
| | M | 54 | 46 | 57 | 39 | 36 |
| | D | 12 | 11 | 15 | 10 | 17 |
| | **Total** | **331** | **338** | **427** | **459** | **401** |
| **All Majors** | **Grand Total** | **928** | **932** | **1017** | **1060** | **1102** |

*B = Bachelor's    M = Master's    D = Doctoral*

*(1) Beginning in Spring 1997, Master and Doctoral programs in Electrical Engineering became Electrical and Computer Engineering.*

*(2) Beginning in fall 2002, the Graduate School of Library and Information Science was changed to the School of Information.*

*Sources:  Reports of Degrees Conferred as compiled by the Office of the Registrar, the Deans of the Schools and Colleges, and the Office of Institutional Research.*

***Sub-baccalaureate Preparation – Education and Skills Training***

**Industry Certification Programs**

Certification of skill and knowledge is especially important in the field of computer and information technology. Appendix C contains a list of skill certifications compiled in 2003 by the Texas Skill Standards Board for the industry category, "Telecommunications, Computers, Arts and Entertainment and Information." As this appendix illustrates, an enormous variety of skill certifications exists in these industries.

Some certifications are vendor-neutral, meaning that they operate with equipment from a variety of vendors. Others are vendor-specific (e.g., Microsoft, Cisco), but since these vendors have such a large share of the product market, their certifications are meaningful in the labor market.

As wireless technologies mature, professional and industry groups are becoming established and developing a variety of skill standards and certifications specifically in wireless.

Some of the key certification activities in wireless include the following:

The Society of Cable Television Engineers (SCTE) and the National Cable Television Institute (NCTI) have joined to provide a series of training materials and certifications for jobs in the telecommunications industry (http://www.ncti.com/)

The Association of Wireless Professionals (AOWP) (http://www.aowp.org/) offers education and certification programs for sales and customer service professionals working in wireless.

The Global Wireless Education Consortium (GWEC) (http://www.gwec.org) brings companies and institutions together to develop curricula for a strong wireless workforce. GWEC has published 22 "points of knowledge" for inclusion in curricula at two-year and four-year institutions. The points range from basic skills to switching expertise, radio frequency (RF) Theory, microwave knowledge, test tools, health and safety, and regulatory standards and conventions. In collaboration with Seattle area community college, GWEC developed and published skill standards for wireless telecommunications in two areas of concentration: (1) Deployment and implementation: workers who install, troubleshoot and test equipment, and (2) Maintenance and operations: workers who repair, troubleshoot and maintain systems. In each concentration, the report identifies associated activities, knowledge and skills required, and performance indicators.[6] These skill standards were created in 2001 and have not been updated.

The Wireless LAN Association (http://www.wlana.org) offers a variety of free educational papers as well as training and self-study materials for sale to help workers prepare for a variety of wireless certifications, including the following:

- Certified Wireless Network Administrator (CWNA®)
- Certified Wireless Security Professional (CWSP®)
- Certified Wireless Analysis Professional (CWAP®)
- Certified Wireless Networking Expert (CWNE®)
- Certified Wireless Network Trainers (CWNT®)

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[6] State of Washington Board for Community and Technical College. 2001. "Skill Standards for Wireless Telecommunications" http:/www.wa-skills.com/PDFs/wireless_tele/WIRELESS.pdf

These certifications were developed by Planet3, a Georgia Corporation. As indicated later in this report, the certifications are becoming recognized by Austin area employers.

**Education and Training Providers and Offerings**

**Austin Community College** offers several two-year degree programs that relate to segments of a broadly defined wireless industry cluster, including engineering, digital publishing and graphics technology, engineering design graphics and visual communication design. Table 3 provides a statistical profile of students participating in these departments. The ACC programs most closely related to wireless needs are located in the Electronics Department and in the Computer Studies Department. Generally, the Electronics Department focuses on hardware issues whereas the Computer Information Technology Department concentrates on software and network administration issues.

**The ACC Electronics Department** has recently re-organized its curriculum around a core offering three specialization options currently offered:

- Computer electronics/telecommunications
- Semiconductor technology manufacturing technicians (SMT)
- Automation, robotics and control

Additional specializations are being considered in power generation and transmission, biotechnology and biomedical instrumentation, nanotechnology, and in wireless technology.



ACC Program Specializations related to Electronics
- Current and Under Consideration -
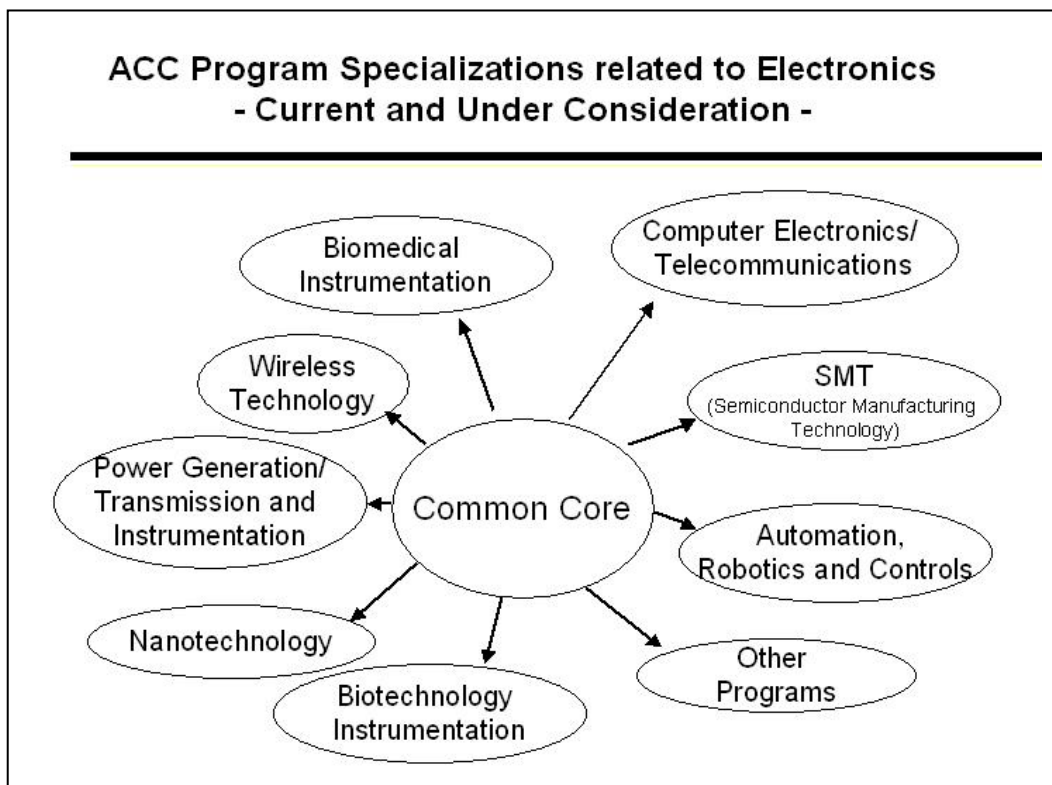
All electronics AAS students under this new curriculum take a common core of courses, which include 39 units aimed to provide a common foundation. The core technical courses include DC circuits, AC circuits, Solid State devices, Digital Fundamentals, College Physics, Data Acquisition and Measurement, Fundamentals of Programming, Computer Systems Maintenance, and Electromechanical Systems. In addition, the core curriculum includes 15 units of general education courses in algebra, English, social studies and humanities required for an associates' degree.

The core-specialization approach is being implemented to help both students and the college become more agile in adapting to change. So, for example, if an individual becomes unemployed in an initial industry, rather than re-taking a full new program, a student who has passed the electronics core would need only a sequence of five specialized courses to acquire a new specialty. Likewise, if employment in an industry declines (e.g., as did semiconductor manufacturing after the year 2001), Austin Community College does not need to close full programs as enrollment dwindles. The new core-specialization curriculum format does present challenges, however. It needs to be well designed and implemented to avoid duplication and to fit within the Texas Higher Education Coordinating Board's maximum 72-hour limitation on community college curriculums, which constrains how much can be taught in associate degree programs. The precise list of courses to be included under any new proposed wireless specialization has not yet been determined.

**The ACC Computer Studies Department** offers a two-year Associate of Applied Science (AAS) degree in Computer Information Technology, focused on computer programming as well as an AAS degree in Local Area Network Systems Administration. In addition, specialty one-year certificate programs are also available in:

- Computer information technology database
- C++ computer programming
- JAVA computer programming

An academic Associate of Science (AS) degree is available for students who want to continue their studies in a four-year institution. A new survey course has been proposed for the department, entitled "Fundamentals of Wireless LANS." This is the first Texas state-approved course to have the word "wireless" as part of its title.

For the most part, the courses offered by the electronics department complement courses in computer information technology. But there is some overlap for electronics students; for example, electronics students get some exposure to computer programming (particularly in C++) as part of their core courses and those who elect a specialty in Computer Electronics/Telecommunications will study computer networking. For students in computer information technology, there is little or no overlap with the subjects of electronics courses.

No skill certifications are built into the regular ACC curriculum either in electronics or in computer information technology, but students are advised to acquire certifications to enhance their resumes. ACC Continuing Education offers courses to prepare for various computer certifications through its High Technology Institute.

To determine the future of training for wireless technology, Austin Community College has been seeking feedback from representatives of wireless companies and wireless groups in other types of technology enterprises on how appropriate training for the wireless industry should be organized. Dr. Hector Aguilar, Chair of the ACC Electronics Department, recently launched a new Wireless Advisory Committee with a meeting on June 17 to consider the possibility of creating a program directed to the wireless area.

The **High Technology Institute** at the **Austin Community College Continuing Education** offers training for Microsoft, Cisco, Sun, Oracle, Linux, and CompTIA certification, as well as various local certificates developed by ACC. Many institute instructors combine teaching at ACC with work in the information technology (IT) field. Thus they have real-world experience to enrich their classroom presentations. The aims of the High Technology Institute are as follows:

1. Meet the needs of the local high tech industry by providing the students with skills and certifications in the latest technical programs and processes,

2. Provide educational opportunities through a variety of delivery methods for both the new, emerging technical worker as well as the experienced technologist currently in the workforce, and

3. Serve as an information resource to the community about technical education programs.

A listing of courses and certifications offered at the ACC High Technology Institute during summer 2005 can be found in Appendix D.


**Other Sub-baccalaureate Education and Training**

Austin Community College is the largest and least expensive provider of education and training in Austin. In addition to Austin Community College, numerous proprietary schools, nonprofit training organizations, and consultants provide a variety of training and certification in computer-related subjects. Examples of other Austin-area schools include the ITT Technical Institute at Austin, New Horizons, CyberTex, and Virginia College at Austin. [7]

The ITT Technical Institute and New Horizons are branches of large national or international proprietary schools with a focus on information technology training. ITT Technical Institute offers associate degrees in computer network systems, software applications and programming and web development, among others. New Horizons offers a variety of training for industry certifications from Microsoft, CompTIA, Linux, Citrix, Novell, and Cisco. New Horizons offers a variety of specialized training on information security; and it has a training package for support personnel who staff help desks. CyberTex is an Austin firm that provides network support services, software development, and training for a variety of certifications from CompTIA, Microsoft, and Cisco. Virginia College at Austin is the branch campus of a private proprietary postsecondary institution offering associate degrees and diploma courses ranging from one to two years in length. It provides specialized preparation for nearly 600 students in computer networks and network security and offers Cisco, Microsoft, and Linux certifications. More detailed profiles of each of these schools can be found in Appendix E.

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[7] This sampling of Austin training resources is presented only to give an indication of what is available. No endorsement or approval of the named entitles is intended or implied.

**Table 3: Statistics on Student Population in Austin Community College Programs**

| Academic Areas | 1999-2000 | 2000-2001 | 2001-2002 | 2002-2003 | 2003-2004 |
|---|---|---|---|---|---|
| **Engineering** | | | | | |
| Course Enrollment (Fall) | 74 | 78 | 84 | 88 | 89 |
| Semester Credit Hours (Fall) | 167 | 196 | 202 | 220 | 215 |
| AS Degree Awarded | 13 | 12 | 8 | 15 | 4 |
| **Workforce Areas** | | | | | |
| **Computer Information Technology** | | | | | |
| Course Enrollment (Fall) | 1,727 | 1,656 | 1,533 | 1,195 | 1,116 |
| Semester Credit Hours (Fall) | 5,416 | 5,164 | 4,789 | 3,741 | 3,489 |
| AAS Degree Awarded | 29 | 57 | 60 | 56 | 49 |
| Certificates Awarded | | 16 | 43 | 33 | 27 |
| **Computer Science** | | | | | |
| Course Enrollment (Fall) | 2,948 | 2,670 | 2,190 | 1,636 | 1,576 |
| Semester Credit Hours (Fall) | 8,932 | 8,119 | 6,662 | 4,975 | 4,809 |
| AS Degree Awarded | 14 | 14 | 22 | 14 | 11 |
| **Digital Publishing & Graphics Technology** | | | | | |
| Course Enrollment (Fall) | 224 | 215 | 180 | 41 | * |
| Semester Credit Hours (Fall) | 778 | 788 | 656 | 162 | * |
| AAS Degree Awarded | 1 | 2 | 4 | 6 | 4 |
| Certificates Awarded | 10 | 20 | 11 | 16 | 11 |
| **Electronics** | | | | | |
| Course Enrollment (Fall) | 663 | 569 | 436 | 323 | 229 |
| Semester Credit Hours (Fall) | 2,305 | 2,101 | 1,668 | 1,236 | 916 |
| AAS Degree Awarded | 67 | 49 | 57 | 58 | 37 |
| Certificates Awarded | 33 | 26 | 32 | 38 | 18 |
| **Engineering Design Graphics** | | | | | |
| Course Enrollment (Fall) | 462 | 496 | 486 | 438 | 388 |
| Semester Credit Hours (Fall) | 1,848 | 1,984 | 1,944 | 1,737 | 1,552 |
| AAS Degree Awarded | 41 | 33 | 40 | 44 | 32 |
| Certificates Awarded | 27 | 36 | 31 | 28 | 25 |
| **Visual Communication Design** | | | | | |
| Course Enrollment (Fall) | 834 | 910 | 953 | 942 | 975 |
| Semester Credit Hours (Fall) | 2,502 | 2,730 | 2,859 | 3,619 | 3,707 |
| AAS Degree Awarded | 29 | 30 | 33 | 30 | 32 |
| Certificates Awarded | 12 | 14 | 23 | 22 | 18 |

* Data for Digital & Graphics Technology are included in Visual Communication Design starting Fall 2004.

*Source: ACC Fact Book 2004-2005*

**Definitions:**

**Course Enrollment**-the number of students enrolled in a course.  Duplicated enrollment occurs when a student is counted more than one time because they are enrolled in more than one course.

**Semester Credit Hours**-defined as one clock hour of class per week.

**Degrees and Certificates Awarded**-defined as the number of degrees and certificates awarded over the entire school year.

NOTE: These figures do not include on-line enrollments, nor students enrolled for courses in continuing education.

**Capital IDEA wireless training.** Capital IDEA is a nonprofit, community-based organization, which helps unemployed and underemployed Central Texas adults gain access to well-paying jobs in healthcare, high technology and accounting through long-term training and support services.

As part of its offerings in high technology, Capital IDEA administers a special wireless training project funded by the Texas Workforce Commission (TWC) to train Wireless Installation Technicians. The 9-month program prepares technicians to install, configure and troubleshoot wireless LAN hardware peripherals and protocols. The training is organized around four skill certifications: COMPTIA's A+, Network+, Cisco Computer Network Associate (CCNA), and Certified Wireless Network Administrator (CWNA) from "Planet3." CyberTex, Inc. is conducting the technical training for this project under a subcontract with Capital IDEA. Near the end of the program, the trainees will participate in unpaid internships with the Austin City Wireless Project. Capital IDEA conducts recruitment and screening for the program and provides counseling and supportive services to help assure that participants successfully complete the program. Employers participating with the program include Time Warner Cable, Wayport, Arimba Wireless, and SkyVue USA.

Working with Time Warner Cable and Austin Community College, Capital IDEA has also developed a 12-week program to train Broadband Cable Technicians. Beginning in the third week of the program, trainees serve an internship one day per week with either Time Warner Cable or Grande Communications, employer partners in the program.

In collaboration with Time Warner, Capital IDEA also sponsors adults studying to become Network Administrators in the regular two-year Associate of Applied Science (AAS) degree program in Local Area Network Systems Administration.

Both the Wireless Installation Technician and the Broadband Cable Technician programs were recently established and thus do not yet have a track record or outcomes.

**Concluding Note**. In summary, a large variety of public and private training resources and courses available on-line developed to assist people to prepare for a confusing array of industry certifications in computer applications, network administration, and other subjects offered by CompTIA, Microsoft, CISCO, Linux and others. These courses and certifications offer foundational skills and knowledge that is essential for work in wireless technology.

At this point, current training and certification offerings specifically focused on wireless in Austin are relatively scarce. One source, Dr. Eric Reifsnider of Wireless Valley, offers advanced training for expert network administrators in Planet 3 wireless courses, as well as a variety of vendor courses regarding Wireless Valley software products and topics on indoor wireless networks. However, access to these courses is limited to Wireless Valley customers. Other than Wireless Valley, we found only CyberTex offering local, in-person training for the Certified Wireless Network Administrator (CWNA) certification, which is part of Capital IDEA's package of training and limited to participants in their program.

# Critical Skill Shortages

*"*Every company pays for a training program, whether they have one or not.*"*

*- Robert Egloff*

This section reports on difficult-to-fill occupations that do not require a baccalaureate degree, although 4-year degrees may be preferred for some of these occupations and required by some employers.  Industry representatives and data did not support a finding of shortage occupations as much as identify occupations that employers found difficult to fill; hence the slight adjustment in terminology.

Information for this section came from observations during two Wireless Advisory Committee meetings organized by ACC for Wireless industry representatives, in-person interviews with industry representatives, and follow-up emails and phone conversations, as well as from scans of job postings on company websites, on WorkInTexas, and on Monster.com during July 2005 (See Appendix B).

Workforce developers have been working to get a handle on the "What is wireless?" question, acknowledging that it cuts across different disciplines, in order to identify the knowledge, skill sets and levels, and the gaps that are making it difficult for employers to find the people they need for current and projected jobs.  This section attempts to address some of these questions.

Key points from the Critical Skills Project review of the local wireless industry cluster are as follows:

- Many jobs are difficult to fill solely from local Austin sources.  Employers reported recruiting out of state and through national electronic job search sites, such as Monster.com or RFCafe.com.

- While employers often express a preference for candidates with 4-year college degrees in testing and other technical areas, several acknowledged using the degree as a proxy for having a certain level of technical skills and maturity; for certain testing, technician, and sales-oriented jobs, employers would be willing to hire skilled people with some applied experience, but without 4-year degrees.

- Excellent problem-solving, analytical, and communication skills are musts, even for technician-level positions, since employees across a wide spectrum in this industry must be able to interact directly with customers and teammates throughout their organizations, with people who have widely varying degrees of technical expertise.

- Jobs in the wireless industry, whether in phone-based or internet-based wireless communications, require the ability to conduct detailed testing and troubleshooting, and to work through complex problems with compatibility of different types of systems, including hybrid networks.

- Employers remarked that, in an ideal world, "We would only hire people who already have some work experience," but they acknowledge that the work experience has to come from somewhere.  Several employers are willing to consider providing internships, but report that until the company reaches a certain size, they cannot spare the time of experienced workers to supervise or fully train interns or workers without such experience.

- Wireless is viewed as a skill set "on top of" other core skill sets for networking or RF technologies, not as an isolated skill set. That said, there are skills specific to wireless (such as knowledge of the protocols) that are non-negotiable for work in these areas.

- Many Austin companies have strengthened their internal screening processes, both for skills and for "culture fit" with the company's values and work environment to reduce turnover. Most provide in-house or structured on-the-job training on their own products and services.

**Difficult-to-fill Occupations and the Skills Required**

### Test technicians and validation engineers
(For companies/employers such as Alereon, Dell Wireless Group, and SBC Labs)

Several employers noted that the biggest demands in the product groups of various companies are people who can "design and test the systems, debug and troubleshoot, and then go back with feedback for the next level of prototype." One commented, "Lots of folks, even highly educated people, are uncomfortable with testing equipment."

Several employers preferred to hire college graduates with engineering backgrounds; however, these newly-minted engineers often wanted to focus more on design than on testing, and were not accepting jobs at this level to meet their demand. This situation has caused employers to consider "downgrading" their requirements for 4-year college degree engineers to candidates with 2-year degrees who have advanced skills and experience conducting testing using spectrometers and other highly technical testing equipment. They indicated that the right combination of skills – technical, analytical, and communication – is hard to find in people who want to work in those positions.

Employers with this need are looking for the following types of knowledge, skills, and experience:

- Firm understanding of all wireless and networking standards and protocols (802.11, TCPIP, abgnx, etc), including security, encryption, etc.
- Bluetooth
- 3G standards and methodology
- Basic electronics (electrical schematic reading and debugging of circuitry)
- Operating systems (OS): basic registry functions to manage installations and uninstallation processes
- Bus architecture class: PCI, PCIe, USB, IRQ management, enumeration
- Basic Programming: Writing test scripts
- Basic Antenna Theory
- Familiarity with operating ALL radio-related test equipment (Spectrum Analyzer, Network Analyzer, Attenuators, Switches, Bus Analyzers, Signal Generators, LabVIEW, etc.)
- Analytical problem-solving (with hands on application) for WANs, Networks, laptops - Combine networking/computer science/electronics/computer maintenance – also computer networking with different systems and configurations
- Data reduction techniques – put measurements into (for example) Excel tables, be able to analyze and interpret results.
- Applied R&D side; clear documentation and being able to communicate technical information clearly and cleanly (verbal and written)

There are some differences in this list by product or company, of course.  For example, some companies noted that they need chip-and board-level testing (for integration) specifically.  One firm (Freescale) noted a need for very detailed soldering and complex wire-bonding working from a schematic.  But that specific need was not common across companies as were the other responses.

Several employers mentioned Test Spectrum, an Austin company founded in 1999 to provide the semiconductor industry with technical solutions for test development applications, as an important company in the cluster. They also mentioned National Instruments because of their LabVIEW software, a "graphical development environment for creating flexible and scalable test, measurement, and control applications." [8]

### Broadband Technician/ Integrated Technician/Technician for WAN Installations and Support
(For companies such as Time Warner Cable, Wayport, and Trillion)

Employees in these positions may install cable TV service (RF side) and install software on subscribers' computers, or provide phone Technical Support by troubleshooting RF signal levels, software conflicts, packet loss through networks, and other problems; in both cases, during installations or Tech Support, they must have strong communications and "people" skills.

Employers emphasized the need for technicians to be strong in the "fundamentals" of networking, to have a solid understanding of the components of wired and wireless systems, and how those systems might interact in hybrid networks.   Employers concurred that a "degree" in wireless would not only be unnecessary, but would miss the point … that employees must be very flexible and understand an array of systems in this fast-changing environment.

More than one company that installs wired networks is deploying "last mile" solutions – using wireless 802 boxes if there are no cable lines in the last mile of service.  The flip side is that wireless companies are beginning to develop *hybrid networks* for customers who already have wired networks and do not want to replace the entire system, but do want the added flexibility of wireless.  As one company representative noted, "We need to provide the best solution for the customer, and for customers that already have broadband, that is increasingly requiring hybrid solutions.  That means that all of our technical people need to be expert with both kinds of systems to ensure compatibility and functionality.  And they have to be able to figure out whether a problem is stemming from the LAN (Local Area Network) or the WAN (or wireless network)."

Wayport already experienced the problem that the Critical Skills Project seeks to address, specifically that they were trying to hire 100 technicians within a few-month window. When applicants did not possess the needed knowledge or skills to Wayport's criteria, the company developed its own week-long, in-house training for all new technicians. Wayport noted that many of the candidates who were not able to demonstrate sufficient knowledge of networks during the application and interview process had 2-year degrees, various networking certifications, and other certifications, but they were not "fluent" enough to discuss the components of a system, what the configurations meant, where problems tended to emerge, and effective troubleshooting procedures.  Wayport was willing to consider candidates with informal networking backgrounds – people who have been tinkering with computers since childhood and are the tech support person of choice to their friends and family – if they could meet employers' skill/knowledge criteria.

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[8] http://www.ni.com/labview/

The following list of skills, knowledge, and experience summarizes what employers with these occupational needs are seeking:

- Firm grasp of all networking basics – what all the computer settings mean and how they interact, proxies, firewalls, server issues, etc.
- Analytical problem-solving (with hands on application) for WANs, Networks, laptops - combine networking/computer science/electronics/computer maintenance – also computer networking with different systems and configurations
- Familiarity with all protocols (802.11) and standards for configurations, both wired and wireless
- Knowledge of RF technology to include microwave radio transmissions
- Can perform network testing which includes electrical, RF, optics and data
- Can analyze/troubleshoot problems – RF signal levels, software conflicts, packet loss through network; this is true for technicians who install service at customer homes or technicians who provide phone Technical Support
- Able to perform/assist with installations and site surveys
- Able to perform/assist with quality inspections
- Able to develop and maintain a positive rapport with customers
- Installation experience in the wireless or telecommunication industries

At some companies, employees hoping to progress financially and "up the career ladder" are expected to obtain certifications on their own; one company noted that productive employees who received their certifications can be earning up to 50% increases in their hourly wage, compared to starting wages.  The particular certification valued varies by company.  For example, Time Warner encourages its employees to obtain certifications through the Society of Cable Television Engineers (SCTE) and National Cable Television Institute (NCTI).   At other companies, certifications (such as CCNA)–rather than college degrees–are required to achieve well paying positions in System operations and Network Operations Centers (NOC).

*Certified Wireless Network Administrator (CWNA)* certification was viewed as desirable by some employers.  CWNA covers a broad range of wireless LAN topics focused on 802.11 technology rather than products of specific vendors. CWNA training and certification prepares the trainee to administer wireless LANs, regardless of which vendor product is used.  The main subject areas covered by the CWNA exam are:

- Radio Technologies
- Antenna Concepts
- Wireless LAN Hardware and Software
- Network Design, Installation, and Management
- Wireless Standards and Organizations
- 802.11 Network Architecture
- Wireless LAN Security
- Troubleshooting
- How to Perform Site Surveys

The CWNA certifies that successful candidates know the fundamentals of RF behavior, can describe the features and functions of wireless LAN components, and have the skills needed to install, configure, and troubleshoot wireless LAN hardware peripherals and protocols.  A company offering training for this certification recommended that a typical candidate should

have CompTIA Network+ or Cisco CCNA certification or equivalent knowledge, although these certifications are not required to take the CWNA exam.[9]

### Wide Area Network Design Specialist
(For companies such as Wayport and Trillion)

WAN Design Specialists are usually engineers who conduct site surveys and plan network deployment.  Hybrid network development is likely to grow and will need to support data networks for point-to-point and Voice-Over IP (VOIP), as opposed to cellular networks that provide voice-to-multipoint service, although perhaps those areas will also hybridize in the future.  WAN Network Designer positions require experience in the field, particularly for small companies that cannot afford to "double up" to train employees or deploy an in-house training program.  Typical requirements for these positions include:

- Knowledge of RF technology to include microwave radio transmissions
- Experience with drafting software (Visio, CAD or equivalent)
- Familiarity with SITE PLAN tools, to locate and plot sites using mapping software (DeLorme, X-map, TAP) and verify proposed wireless paths using topographical software (on top of what is needed from traditional wired networks)
- Experience with network design or wireless networking (solid 802.11 background)
- Able to prepare design maps as needed and complete all associated documents and drawings for each project
- Project management skills
- Team skills
- Excellent written and verbal communication skills to interact with people at all levels inside and outside of the company

### Technical Sales/Retail Sales/Regional Sales Representatives
(Employers such as Verizon Wireless and Trillion)

There are different types of sales positions within the wireless arena, with different levels of skill requirements and degree requirements, ranging from a high school diploma or GED to a 4-year college degree preferred or required by some employers.  However, the basics were somewhat similar, with different levels of technological and project management expertise required for different levels of sales positions.  For any of the levels of sales positions, employers wanted:

- Familiarity with the technology, with a strong technical background desired - able to conduct demonstrations, handle small local installs, and troubleshoot minor problems
- Aggressive, ambitious personalities for selling
- Comfort working over the phone, and good telephone personas
- Computer literacy in Microsoft Office - Word, Excel, PowerPoint, Access

For higher-level sales jobs requiring experience, employers want to assure that employees can handle:

- Prospect identification and research
- Sales presentations and follow-up
- Management of prospect list and customer relations, using databases
- Knowledge of wireless transport networks and systems

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[9] http://www.cwnp.com/cwna/exam_objectives.html

Also in the wireless arena, employers did have some less skilled jobs in "*kitting*" – working in the company warehouses to assemble wireless kits to be deployed to sites.  Workers in these jobs must be detail-oriented, and have to be able to read and follow diagrams to assemble the wireless kits for deployment and provisioning. Employers did not report having trouble hiring for these positions, but a boom could quickly cause an upsurge in the needs for people at this skill level.  Such a boom may open opportunities to train these entry-level workers who become familiar with wireless hardware components for upgraded positions in wireless.

# Factors Contributing to Skill Shortcomings and Shortages

Wireless needs are fast-changing and many needed jobs, with the exception of the engineering and research positions, do not require advanced degrees or years of preparation.  People can build wireless skills on top of other skill sets.

## Issues with Training and Preparation

The wireless industry – with cluster elements of telecommunications and networking, electronics (particularly Radio Frequency and microwave), computer software and programming, digital media for cellular, and even skill needs in Computer-Aided Drafting and Design for wireless site surveys - is complex and fast-changing. Among occupations described in the previous section, there seem to be three major *types* of jobs particularly relevant to the targeted workforce arena:  test technicians who focus on electronics; integrated technicians who work with telecom networks for installation and technical support; and technical sales jobs.

Companies do fill a lot of positions locally, but consider it a necessity to recruit out of state through staffing firms and electronic media such as Monster.com and RFCafe.com to find qualified workers.  Skill needs are constantly evolving – the technology and equipment change regularly – but some of the core skill and knowledge areas and elements are still required as a base foundation.

The "*What is wireless?*" question among workforce developers contributes to the challenges that employers are now facing and would expect to face in the future with continued growth in the wireless industry in Austin.

### *Training Fit, Capacity, and Utilization*

In the wireless arena, issues with training fit, capacity, and utilization appear to be interrelated and are difficult to discuss independently.

Industry representatives said that, while they are able to hire a number of qualified candidates, they also see *many candidates for open positions who lack the proper foundational elements to "put it all together," with a balance of RF, networking, all the wireless protocols, great analytical skills, testing and troubleshooting capabilities, and communication/people skills.*  Candidates need different balances of RF vs. networking, testing vs. installation and people skills, etc. depending on the type and level of the position they are seeking to fill.

Preparation study courses for Certified Wireless Network Administrator (CWNA) certification are readily available online, and national companies also provide CWNA "boot camp" preparation programs in various cities, with program costs in the $2500 range.  Although

these courses assume some prerequisite knowledge and experience, some companies that offer boot camps will guarantee passage of the certification exam or will allow participants to retake the training within the year.  This approach with the certification programs may speak to the "lack of fluency" that some employers discussed; applicants had been able to pass the certification exams, but their focus on the exam was more narrow than the needs of the employers for employees who had a broad understanding of networking issues and who were able to analyze and troubleshoot problems and communicate clearly about technical issues.

Beyond certification programs, Austin training options specifically geared to, or promoted as, preparation for careers in the wireless industry are not extensive at this point.  This may be, at least in part, related to that confusion about "What is wireless?"  There is no clearly outlined course (or courses) of study at Austin Community College geared toward different types of wireless jobs in demand.  As such, the combination of the courses that ACC offers may indeed provide solid grounding for wireless jobs, and there may be available capacity in all of those courses.  Without clearly identifying wireless content and the associated courses, it is difficult to gauge true capacity.

The wide array of options is likely to be confusing to some potential trainees.  Austin Community College offered a new survey course for Fall 2005 entitled "Fundamentals of Wireless LANS," the first Texas state-approved course to have the word "wireless" as part of its title. Local industry representatives have not yet validated the content of that course.  If the course is a good fit for industry needs, the lack of enrollment suggests a problem where training options being underutilized.

In addition, several companies reported working in **specialized niches** of the industry, where their needs for wireless employees were so specific, and the numbers of employees in these areas of need were so few, that they did not expect local training providers to be able to prepare workers to meet those needs.  For those types of positions, they preferred to hire workers who had relevant job experience and who had the aptitude to adjust to the specialty context and develop the niche skills through a combination of OJT and in-house training.

Because the needs in wireless are emerging and will continue to evolve, clarifying the issues with training fit, capacity, and utilization will require further investigation and assessment.


### *What's at the Root?   Communication about Workforce Needs*

Even if it is not possible to have a definitive assessment at this time of any mismatch between workforce training and workforce needs in wireless, some factors contributing to the mismatch in worker skills and employer needs are beginning to surface.

*Focus on branding and "top talent"*

Industry representatives concerned with economic development of the wireless industry in Austin, for example, the Austin Wireless Alliance, are focused on marketing and branding Austin.  While they do discuss recruiting venture capital and top wireless research, management and marketing talent, they pay little attention to developing the workforce at a range of skill levels to feed the development of this industry in Austin.

*Cross-cultural communication between industry and educators needs improvement*
ACC recently took a much-needed step toward clarifying industry needs by launching a new Wireless Advisory Committee, convened by the Department Chair for Semiconductor,

Robotics, Telecommunication, and Electronics Programs.  The first meeting was held in June 2005 and included ten industry participants, and a slightly larger number of ACC administrators and faculty.  This effort aimed to address questions about whether a new wireless degree program or specialty should be established, and if so, what it would cover.  ACC was also particularly interested in knowing whether it should be an electronics program, a computer studies program, or some form of joint program, and in determining whether the wireless program should be a 2-year degree program or a 1-year certification program.

The ACC Department Chair asked for input from the industry representatives on these questions:

- What is the 'true' present need of wireless-trained people, according to the industry participants?  How many jobs were we realistically looking at?
- What would a typical technician in each of the companies participating be doing at this instant?
- What were the specific skill sets that would be required to perform these jobs?
- What job skills and school/training credentials do current employees getting hired have?
- If given a choice, what skill sets would these candidates have?
- What are realistic pay scales for these employees (entry and experienced)?

Industry representatives took turns during the meeting describing their skill needs and hiring needs.  The "occupational needs" summary contained earlier in this report was informed by this discussion by the industry representatives.  ACC also shared information about existing ACC programs.

During the kickoff meeting, ACC staff seemed highly focused on two internal issues that, in the view of the Critical Skills Research Team, seemed to be "getting in the way of" determining the training options most relevant to the needs expressed by employers, and lessening the engagement of the industry representatives.

The first was ACC's concern about the Texas Higher Education Coordinating Board (THECB) requirement that community college degree programs cap the program credit hours at 72, because requiring students interested in wireless careers to complete all the coursework related to a Electronics Associates Degree would likely exceed the 72-hour program cap, with some of those courses unnecessary for work in the wireless industry.  The second concern related to which department was more appropriate for a Wireless program; ACC staff were concerned that having two separate wireless programs – one in Electronics focused on the RF skills and testing and one concentration in Computer Studies focused on networking - would mean that wireless classes would not "make."  During the first Advisory Meeting, industry representatives tended to remain quiet during lengthy exchanges by instructors about credit hours, departments, course titles, and the WECM (Workforce Education Course Manual).

At several points during the 2-hour kickoff meeting, ACC faculty asked, "Does this mean a 2-year degree program or a 1-year certificate program?"  Industry representatives acknowledged that they did not know how long the program should be; they assumed that ACC could determine the program length if they were clear about what skills and knowledge needed to be learned, and they did not appear to care which department the program or courses were based in, as long as interested candidates would know which courses to take.  One ACC faculty member equated an ACC one-semester course to Wayport's one-week in-house training, noting that they are about the same number of contact hours.  Since Wayport was trying to hire 100 people over a relatively short period of time, a semester and

a week were not equivalent from Wayport's perspective, even if the same number of hours were involved. In addition, Wayport's week-long in-house training covers networking fundamentals for wired AND wireless systems. ACC's Fundamentals of Wireless LANS course has a prerequisite of an additional course, Fundamentals of Networking Technologies. Presumably, ACC's two courses would provide significantly greater depth, but would also take significantly longer to teach, and Wayport's trainees already have some background in networking, so Wayport's course may be designed as a refresher, rather than starting trainees from scratch.

ACC faculty requested that industry representatives bring their job descriptions or lists of skill requirements to the next meeting. Several industry representatives said that their job openings and descriptions were posted on their company websites, and that the descriptions included technical specifications.

Only one industry representative attended the second meeting, held on July 15. One other industry representative who had attended the first meeting emailed a list of his company's skill requirements after this meeting.


# Recommendations and Next Steps

As Wayport's significant expansion during the past year well illustrates, Austin and its local population have not been well positioned to take advantage of opportunities that economic development offers in wireless technology.

Establishing a more streamlined mechanism for input and dialogue will be essential for local training providers to remain "up to speed" on industry needs in this rapidly changing arena, to reflect the wireless industry's aptitude for change. This will not affect the need for engineers, at the highest workforce levels that the Austin Workforce Alliance leadership focuses on, but it could have a significant effect on the preparation of skilled workers at other levels. Conversations between employers and training providers will be most conducive to finding solutions if the educators listen to the skill needs of employers and then accomplish the "translation" into courses, credit hours, and program length among themselves, perhaps submitting their proposal back to industry for validation. This last step is an important one, in that, while industry representatives may not want to participate in lengthy meetings to decide on the details of course offerings, they really do care that the training is well designed and offered in a timely fashion to meet their needs.

Even though training institutions may not be able to keep completely up to date with the latest technologies, the best approach seems to be providing solid grounding in the basics and a platform for further learning once on the job. Because the technologies themselves cross categories – across electronics, telecom, and networking – organizations (including educational institutions, for-profit technical institutes, nonprofit programs, and even companies with in-house training) that are able to flexibly create combinations of classes and other types of training are much more likely to be able to meet employer needs in Wireless.

Capital IDEA's 9-month wireless training program, which packages four skill certifications - CompTIA A+, Network+, the Cisco Certified Network Associate (CCNA), and the Certified Wireless Network Administrator (CWNA®) from Planet3 - seems well conceived to match industry interests. With fewer than 400 trainees in all areas of their workforce programs combined, Capital IDEA's wireless preparation program is small and does not approach the needed capacity. Because the program is new, there has not been sufficient time to

evaluate the preparation and success of the graduates of this wireless training program as they enter employment. However, it offers well-balanced preparation for working in the wireless industry by providing training and certification in an array of essential foundational skills, topped off with specific background on wireless technology; as such, it could serve as the basis of a model for other programs.

As with Biosciences, the computer job matching program, WorkInTexas.com is not "user-friendly" to either employers or job applicants in wireless. This is simply one additional area where the communication and base information about workforce needs could be enhanced. It may well be that in emerging technical areas such as Biosciences and Wireless, employers will rely more heavily on private job matching programs like those offered by Monster.com. This is an issue for further exploration.

We recommend further investigation into the specifics of training fit, capacity, and utilization related to the current and projected needs of employers, and a process to obtain input from industry representatives on summary findings of this report as part of the engagement process toward developing solutions.

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# Appendix A
## Wireless Technology

**Travis County**

### A-1: Wireless Technology, Number of Establishments, 4th Quarter

| NAICS | Description | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|
| 334220 | Radio & Television Broadcasting & Wireless Communications Equipment Manufacturing | | 5 | 6 | 6 |
| 334290 | Other Communications Equipment Manufacturing | 4 | 4 | 3 | 3 |
| 334413 | Semiconductor and Related Device Manufacturing | 49 | 46 | 47 | 39 |
| 443112 | Radio, Television & Other Electronics Stores | 83 | 62 | 65 | 78 |
| 515 | Broadcasting (except internet) | 35 | 30 | 28 | 33 |
| 516 | Internet Publishing and Broadcasting | 17 | 22 | 22 | 19 |
| 5172 | Wireless Telecommunications Carriers (except Satellite) | 56 | 49 | 49 | 53 |
| 5173 | Telecommunications Reseller | 31 | 30 | 40 | 37 |
| 5174 | Satellite Telecommunications | | | | |
| 5175 | Cable and Other Program Distribution | 7 | 7 | | 5 |
| 5179 | Other Telecommunications | | | | |
| 811213 | Communication Equipment Repair and Maintenance | 5 | 5 | 3 | 5 |

*Source: Texas Workforce Commission, Labor Market Information, TRACER, Quarterly Employment and Wages (QCEW)*

# Appendix A
## (continued)

**Travis County**

### A-2: Wireless Technology, Average Employment, 4th Quarter

| NAICS | Description | 2001 | 2002 | 2003 | 2004 |
|-------|-------------|------|------|------|------|
| 334220 | Radio & Television Broadcasting & Wireless Communications Equipment Manufacturing | | 143 | 161 | 153 |
| 334290 | Other Communications Equipment Manufacturing | 491 | 294 | 294 | 320 |
| 334413 | Semiconductor and Related Device Manufacturing | 16,380 | 13,432 | 12,308 | 11,723 |
| 443112 | Radio, Television & Other Electronics Stores | 1,327 | 1,178 | 1,279 | 1,458 |
| 515 | Broadcasting (except internet) | 2,362 | 2,438 | 2343 | 2530 |
| 516 | Internet Publishing and Broadcasting | 214 | 196 | 187 | 200 |
| 5172 | Wireless Telecommunications Carriers (except Satellite) | 1,714 | 1,657 | 1,474 | 1,436 |
| 5173 | Telecommunications Reseller | 724 | 679 | 602 | 566 |
| 5174 | Satellite Telecommunications | | | | |
| 5175 | Cable and Other Program Distribution | 296 | 209 | | 30 |
| 5179 | Other Telecommunications | | | | |
| 811213 | Communication Equipment Repair and Maintenance | 62 | 54 | 21 | 46 |

*Source: Texas Workforce Commission, Labor Market Information, TRACER,
Quarterly Employment and Wages (QCEW)*

# Appendix A
## (continued)

**Travis County**

### A-3: Wireless Technology, Average Weekly Wages, 4th Quarter

| NAICS | Description | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|
| 334220 | Radio & Television Broadcasting & Wireless Communications Equipment Manufacturing | | $1,863 | $1,944 | $1,852 |
| 334290 | Other Communications Equipment Manufacturing | $1,201 | $1,164 | $1,230 | $1,306 |
| 334413 | Semiconductor and Related Device Manufacturing | $1,376 | $1,536 | $1,591 | $2,031 |
| 443112 | Radio, Television & Other Electronics Stores | $455 | $452 | $456 | $448 |
| 515 | Broadcasting (except internet) | $828 | $857 | $817 | $891 |
| 516 | Internet Publishing and Broadcasting | $1,229 | $1,460 | $1,211 | $2,389 |
| 5172 | Wireless Telecommunications Carriers (except Satellite) | $1,186 | $1,136 | $1,114 | $1,146 |
| 5173 | Telecommunications Reseller | $955 | $1,071 | $1,047 | $1,108 |
| 5174 | Satellite Telecommunications | | | | |
| 5175 | Cable and Other Program Distribution | $713 | $688 | | $907 |
| 5179 | Other Telecommunications | | | | |
| 811213 | Communication Equipment Repair and Maintenance | $852 | $949 | $1,072 | $1,013 |

*Source: Texas Workforce Commission, Labor Market Information, TRACER,*
*Quarterly Employment and Wages (QCEW)*

# Appendix A
## (continued)

**MSA Austin-Round Rock**

### A-4: Wireless Technology, Number of Establishments, 4th Quarter

| NAICS | Description | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|
| 334220 | Radio & Television Broadcasting & Wireless Communications Equipment Manufacturing | | 5 | 6 | 6 |
| 334290 | Other Communications Equipment Manufacturing | 6 | 6 | 5 | 6 |
| 334413 | Semiconductor and Related Device Manufacturing | 58 | 54 | 55 | 53 |
| 443112 | Radio, Television & Other Electronics Stores | 115 | 89 | 96 | 105 |
| 515 | Broadcasting (except internet) | 44 | 35 | 31 | 35 |
| 516 | Internet Publishing and Broadcasting | 22 | 26 | 28 | 25 |
| 5172 | Wireless Telecommunications Carriers (except Satellite) | 62 | 55 | 53 | 57 |
| 5173 | Telecommunications Reseller | 40 | 38 | 47 | 44 |
| 5174 | Satellite Telecommunications | | | 3 | 3 |
| 5175 | Cable and Other Program Distribution | 10 | 10 | 5 | 8 |
| 5179 | Other Telecommunications | | | | |
| 811213 | Communication Equipment Repair and Maintenance | 6 | 6 | 4 | 6 |

*Source: Texas Workforce Commission, Labor Market Information, TRACER,*
*Quarterly Employment and Wages (QCEW)*

# Appendix A
## (continued)

**MSA Austin-Round Rock**

### A-5: Wireless Technology, Average Employment, 4th Quarter

| NAICS | Description | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|
| 334220 | Radio & Television Broadcasting & Wireless Communications Equipment Manufacturing | | 143 | 161 | 153 |
| 334290 | Other Communications Equipment Manufacturing | 521 | 323 | 326 | 359 |
| 334413 | Semiconductor and Related Device Manufacturing | 16,833 | 13,813 | 12,588 | 12,010 |
| 443112 | Radio, Television & Other Electronics Stores | 1,640 | 1,515 | 1,735 | 1,899 |
| 515 | Broadcasting (except internet) | 2,490 | 2,487 | 2,384 | 2,583 |
| 516 | Internet Publishing and Broadcasting | 225 | 206 | 195 | 208 |
| 5172 | Wireless Telecommunications Carriers (except Satellite) | 1,745 | 1,692 | 1,505 | 1,474 |
| 5173 | Telecommunications Reseller | 1,063 | 988 | 911 | 887 |
| 5174 | Satellite Telecommunications | | | 5 | 6 |
| 5175 | Cable and Other Program Distribution | 323 | 241 | 70 | 78 |
| 5179 | Other Telecommunications | | | | |
| 811213 | Communication Equipment Repair and Maintenance | 108 | 91 | 40 | 96 |

*Source: Texas Workforce Commission, Labor Market Information, TRACER,*
*Quarterly Employment and Wages (QCEW)*

# Appendix A
## (continued)

**MSA Austin-Round Rock**

### A-6: Wireless Technology, Average Weekly Wages, 4th Quarter

| NAICS | Description | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|
| 334220 | Radio & Television Broadcasting & Wireless Communications Equipment Manufacturing | | $1,863 | $1,944 | $1,852 |
| 334290 | Other Communications Equipment Manufacturing | $1,180 | $1,119 | $1,189 | $1,255 |
| 334413 | Semiconductor and Related Device Manufacturing | $1,370 | $1,534 | $1,594 | $2,011 |
| 443112 | Radio, Television & Other Electronics Stores | $451 | $451 | $446 | $439 |
| 515 | Broadcasting (except internet) | $826 | $853 | $813 | $887 |
| 516 | Internet Publishing and Broadcasting | $1,204 | $1,422 | $1,190 | $2,324 |
| 5172 | Wireless Telecommunications Carriers (except Satellite) | $1,175 | $1,127 | $1,105 | $1,135 |
| 5173 | Telecommunications Reseller | $991 | $1,153 | $1,120 | $1,160 |
| 5174 | Satellite Telecommunications | | | $1,641 | $1,411 |
| 5175 | Cable and Other Program Distribution | $658 | $628 | $690 | $1,025 |
| 5179 | Other Telecommunications | | | | |
| 811213 | Communication Equipment Repair and Maintenance | $1,061 | $1,117 | $1,250 | $1,090 |

*Source: Texas Workforce Commission, Labor Market Information, TRACER,*
*Quarterly Employment and Wages (QCEW)*

## Appendix B
## Job Postings, Wireless (www.monster.com, July Month, 2005),
## Austin, TX and Surrounding Areas

| | Date | Company | Job Position | Requirement | Experience | Career Level Code | Job Position Classification | Career Level | Job Status /Shift | Salary (USD) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7/20 | Cypress Semiconductor | Facilities Tech | Associate Degree | 2+ to 5 Years | R | Tech2 | Experienced (Non-Manager) | FT/3rd(Night) | |
| 2 | 7/19 | Cypress Semiconductor | Production Line Maintenance Technician | Associate Degree | 2+ to 5 Years | R | A/D | Experienced (Non-Manager) | FT | |
| 3 | 7/15 | Cypress Semiconductor | Training Supervisor | Associate Degree | 2+ to 5 Years | R | Tech2 | | FT | |
| 4 | 7/12 | Cypress Semiconductor | Production Line Maintenance Supervisor | 4 year degree or 2 year degree | 2 years semiconductor experience. | R | A/D | | FT/1st(Day) | |
| 5 | 7/12 | Kforce Professional Staffing | Technical Support | | Java and/or J2ME coding experience or at least familiarity with this coding. Applicants must also have working knowledge of XHTML and wireless devices in general and of the media formats PNG, JPEG, MIDI, QCELP, CMX, AAC, MPEG-4, and 3GPP | R | Tech2 | | Temporary / Contract / Project | |
| 6 | 7/9 | Alpine Access | Customer Service Representative | High School or equivalent | 1+ to 2 Years | R | Tech2 | | PT | |
| 7 | 7/7 | Nextel Retail Stores | Service Technician | High School or equivalent | 1+ to 2 Years | R | Tech2 | Experienced (Non-Manager) | FT/1st(Day) | |
| 8 | 7/1 | Wayport Inc. | Technical Customer Support Agent - Tier I | High School or equivalent | 1+ to 2 Years | R | Tech2 | Experienced (Non-Manager) | FT/D,A,N | |
| 9 | 6/30 | Trillion | Wide Area Network Design Specialist | Associate Degree | 2+ to 5 Years | R | Tech2 | Experienced (Non-Manager) | FT | |

R=Relevant for WorkSource,P=Possibly relevant, N=Not Relevant   Tech2=CustomerSupport/IT
Technician,R/A=Research/Analyst,A/D=Assembly/Distribution,B/M/A=Business/Marketing/Administrative, Eng=Engineer,E/Mgr=Executive/Manager,O=Others

| | Date | Company | Job Position | Requirement | Experience | Career Level Code | Job Position Classification | Career Level | Job Status /Shift | Salary (USD) |
|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 6/30 | Cypress Semiconductor | Production Supervisor | 2 year degree or equivalent experience. | | R | A/D | | FT/3rd(Night) | |
| 11 | 6/23 | Intrado | Data Integrity Analyst | High School or equivalent | 1+ to 2 Years | R | R/A | Entry Level | FT/1st(Day) | 27,000 per year |
| 12 | 6/17 | Cingular Wireless | Customer Care Rep I | | | R | Tech2 | Entry Level | | |
| 13 | 6/8 | Solectron | Wireless Customer Service Technician | High School or equivalent | 1+ to 2 Years | R | Tech2 | Entry Level | FT/Rotating | 10 to 11per hour |
| 14 | 6/8 | Solectron | Wireless Customer Service Technician | High School or equivalent | 1+ to 2 Years | R | Tech2 | Entry Level | FT/Rotating | 10 to 11per hour |
| 15 | 6/8 | Solectron | Wireless Customer Service Technician | High School or equivalent | 1+ to 2 Years | R | Tech2 | Entry Level | FT/Rotating | 10 to 11per hour |
| 16 | 5/27 | Novotus | Construction Technician - Austin, TX | High School Diploma. | 2 years installation experience in the wireless or telecommunication industries. Knowledge of RF technology to include microwave radio transmissions | R | Tech2 | | FT | |
| 17 | 5/26 | CIBER, Inc. | Cisco Communications Analyst | High school diploma or general education degree (GED) | 1 to 3 years related experience and/or training; or equivalent combination of education and experience. | R | R/A | | FT/1st(Day) | 18 to 20 per year |
| 18 | 6/29 | Wenzel Associates | Technical Sales and Marketing Engineer | Associate Degree | 2+ to 5 Years | R | B/M/A | Experienced (Non-Manager) | FT/1st(Day) | 60,000 to 90,000 per year |

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|  | Date | Company | Job Position | Requirement | Experience | Career Level Code | Job Position Classification | Career Level | Job Status /Shift | Salary (USD) |
|---|---|---|---|---|---|---|---|---|---|---|
| 19 | 6/15 | Verizon Wireless | Administrative Assistant | High School Graduate or GED. | 2-3 year's experience with responsibility of coordinating the functions of a multi-faceted department that has a high degree of diverse responsibilities. | R | B/M/A | | FT | |
| 20 | 7/6 | Computerlinks | Technical Support Engineer - Enterprise Security | Some College Coursework Completed | 2+ to 5 Years | R | Tech2 | Experienced (Non-Manager) | FT | |
| 21 | 7/22 | Cingular Wireless | Retail Sales-Retail Sales Consultant PT-Austin | High school diploma or GED | 1-3 years of retail sales experience with key holder/cash handling responsibilities. Computer proficiency in MS Office | P | B/M/A | Experienced (Non-Manager) | | |
| 22 | 7/22 | ClearWire | Retail Account Executive | College degree desired (High School Diploma or GED required) | 2 + years experience in retail sales environment required | P | B/M/A | | FT | |
| 23 | 7/22 | ClearWire | Retail Account Executive | College degree desired (High School Diploma or GED required) | 2 + years experience in retail sales environment required | P | B/M/A | | FT | |
| 24 | 7/22 | ClearWire | Retail Account Executive | College degree desired (High School Diploma or GED required) | 2 + years experience in retail sales environment required | P | B/M/A | | FT | |

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| | Date | Company | Job Position | Requirement | Experience | Career Level Code | Job Position Classification | Career Level | Job Status /Shift | Salary (USD) |
|---|---|---|---|---|---|---|---|---|---|---|
| 25 | 7/22 | ClearWire | Retail Account Executive | College degree desired (High School Diploma or GED required) | 2 + years experience in retail sales environment required | P | B/M/A | | FT | |
| 26 | 7/22 | ClearWire | Retail Account Executive | College degree desired (High School Diploma or GED required) | 2 + years experience in retail sales environment required | P | B/M/A | | FT | |
| 27 | 7/22 | ClearWire | Retail Account Executive | College degree desired (High School Diploma or GED required) | 2 + years experience in retail sales environment required | P | B/M/A | | FT | |
| 28 | 7/8 | BearCom | Sales Account Executive - Austin | Computer Literate (Microsoft Outlook, Word, Excel, PowerPoint, etc.) | 2+ to 5 Years | P | B/M/A | Experienced (Non-Manager) | FT/1st(Day) | |
| 29 | 7/7 | Nextel Retail Stores | Major Account Executive | Some College Coursework Completed | 2+ to 5 Years | P | B/M/A | Experienced (Non-Manager) | FT/1st(Day) | |
| 30 | 7/5 | Nextel Communications | Wireless Consultant- San Antonio/Austin | | at least 2 years of proven retail sales experience as well as strong communication and interpersonal skills | P | B/M/A | | FT | |
| 31 | 7/3 | Sprint | Retail Sales Opportunities * San Antonio Metro Area | | | P | B/M/A | | FT | |

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| | Date | Company | Job Position | Requirement | Experience | Career Level Code | Job Position Classification | Career Level | Job Status /Shift | Salary (USD) |
|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 6/22 | Cingular Wireless | Retail Sales Consultant | A High school diploma or GED | 1-3 years of retail sales experience with key holder/cash handling responsibilities | P | B/M/A | Entry Level | PT | |
| 33 | 6/14 | Cingular Wireless | Retail Sales Consultant - AUS | A High school diploma or equivalent | 1-3 years of retail sales experience with key holder/cash handling responsibilities is preferred | P | B/M/A | Entry Level | | |
| 34 | 6/3 | The Mobile Solution | Wireless Sales Representative | High School Diploma or GED(Age 18+) | Wireless experience is a plus but NOT required | P | B/M/A | | FT | |
| 35 | 6/2 | The Wireless Store | Bilingual Retail Sales Representative | High School or equivalent | 1+ to 2 Years | P | B/M/A | Experienced (Non-Manager) | FT | |
| 36 | 5/31 | Sprint | Retail Sales Opportunities * Austin Metro Area | | | P | B/M/A | | | |
| 37 | 7/18 | Wireless Advocates, LLC | Retail Sales - Costco Wireless Kiosks! | | | P | B/M/A | | FT | 20,000 to 60,000 per year |
| 38 | 7/15 | Agere | Sr. Networking Platform Software Developer | Bachelor's Degree | | P | Tech2 | | FT | |
| 39 | 7/15 | Agere | Networking Platform Software Developer | Bachelor's Degree | | P | Tech2 | | FT | |
| 40 | 7/8 | Novotus | NOC Support Technician - Austin, TX | Bachelor's degree in Computer Science or related field | or 4+ years experience in a NOC or support role | P | Tech2 | | FT | |

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| | Date | Company | Job Position | Requirement | Experience | Career Level Code | Job Position Classification | Career Level | Job Status /Shift | Salary (USD) |
|---|---|---|---|---|---|---|---|---|---|---|
| 41 | 7/1 | Nextel Communications | Supervisor, Collections | BA/BS related field or equivalent experience with a minimum 3 years of collection, call center and/or supervisory experience required. | Two years of general, full-time, work experience is considered equivalent to one year of college | P | O | | FT | |
| 42 | 6/29 | Agere | Senior Java Software Developer | Bachelor's Degree | | P | Tech2 | | FT | |
| 43 | 6/10 | Alepo USA | Technical Software Sales | | Experience in VoIP, WiFi, OSS or Telecom billing, – a plus | P | B/M/A | Experienced (Non-Manager) | FT | |
| 44 | 5/24 | NovusEdge | Senior Embedded Software Engineer | | experience in hardware design and implementation: | P | Eng | | FT | |
| 45 | 7/22 | ClearWire | Account Executives/Sales Representatives | BS/BA degree preferred | 1-4 years sales experience (B2C sales experience preferred) | P | B/M/A | | FT | |
| 46 | 7/22 | ClearWire | Account Executives/Sales Representatives | BS/BA degree preferred | 1-4 years sales experience (B2C sales experience preferred) | P | B/M/A | | FT | |
| 47 | 7/22 | ClearWire | Account Executives/Sales Representatives | BS/BA degree preferred | 1-4 years sales experience (B2C sales experience preferred) | P | B/M/A | | FT | |
| 48 | 7/22 | ClearWire | Account Executives/Sales Representatives | BS/BA degree preferred | 1-4 years sales experience (B2C sales experience preferred) | P | B/M/A | | FT | |
| 49 | 7/22 | ClearWire | Account Executives/Sales Representatives | BS/BA degree preferred | 1-4 years sales experience (B2C sales experience preferred) | P | B/M/A | | FT | |
| 50 | 7/22 | ClearWire | Account Executives/Sales Representatives | BS/BA degree preferred | 1-4 years sales experience (B2C sales experience preferred) | P | B/M/A | | FT | |

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| | Date | Company | Job Position | Requirement | Experience | Career Level Code | Job Position Classification | Career Level | Job Status /Shift | Salary (USD) |
|---|---|---|---|---|---|---|---|---|---|---|
| 51 | 6/24 | Intel | Cellular Platform Planner | Bachelor of Science degree in Engineering or Computer Science, or an M.B.A | 3 years of experience in a planning role and experience in the cellular market segment. | N | B/M/A | | FT | |
| 52 | 7/22 | Alereon | Applications Engineer | Bachelor's Degree | 2+ to 5 Years | N | Eng | Experienced (Non-Manager) | FT/1st(Day) | |
| 53 | 7/22 | Alereon | Sr. BaseBand Processor ASIC Design Engineer | Bachelor's Degree | 5+ to 7 Years | N | Eng | Experienced (Non-Manager) | FT/1st(Day) | |
| 54 | 7/22 | Alereon | Sr. MAC ASIC Design Engineer | Bachelor's Degree | 5+ to 7 Years | N | Eng | Experienced (Non-Manager) | FT/1st(Day) | |
| 55 | 7/22 | Freescale Semiconductor | Freescale IT Disaster Recovery Analyst | Bachelor's Degree | 5+ to 7 Years | N | R/A | | FT/1st(Day) | |
| 56 | 7/20 | Wireless Valley | Senior Software Engineer - GUI Designer | Bachelor's Degree | 7+ to 10 Years | N | Eng | Experienced (Non-Manager) | FT/1st(Day) | |
| 57 | 7/20 | Company Confidential | Quality Assurance and Control Manager | | 10+ to 15 Years | N | E/Mgr | Manager (Manager/Supervisor of Staff) | FT | |
| 58 | 7/20 | Company Confidential | Quality Assurance and Control Manager | | 10+ to 15 Years | N | E/Mgr | Manager (Manager/Supervisor of Staff) | FT | |
| 59 | 7/20 | Manpower Professional | Senior System Engineer Manager-Direct Hire at Cisco | BS in Engineering or Computer Science | 7 Years | N | E/Mgr | | FT | |
| 60 | 7/20 | Freescale Semiconductor | Logic IC Design Engineer | Master's Degree | 2+ to 5 Years | N | Eng | Experienced (Non-Manager) | FT | |
| 61 | 7/20 | Wayport Inc. | NOC Engineer (Cisco, Linux) | Bachelor's Degree | 2+ to 5 Years | N | Eng | Experienced (Non-Manager) | FT/3rd(Night) | |
| 62 | 7/19 | Intelligent Technology | Software Engineer - Microcontroller (MCU) | BSCS, BSEE | 5 years of related experience. | N | Eng | | FT | |
| 63 | 7/18 | Wayport Inc. | Senior Oracle Database Administrator (Sr. DBA, 9i) - Oracle Certified Master DBA (OCM) | Bachelor's Degree | 7+ to 10 Years | N | E/Mgr | Manager (Manager/Supervisor of Staff) | FT/1st(Day) | |

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|  | Date | Company | Job Position | Requirement | Experience | Career Level Code | Job Position Classification | Career Level | Job Status /Shift | Salary (USD) |
|---|---|---|---|---|---|---|---|---|---|---|
| 64 | 7/18 | Wayport Inc. | Senior Unix Systems Administrator (Sr. Sys Admin) | Bachelor's Degree | 7+ to 10 Years | N | E/Mgr | Manager (Manager/Super visor of Staff) | FT/1st(Day) |  |
| 65 | 7/16 | Cingular Wireless | Corporate Account Executive II - Austin | Business Degree and/or equivalent work experience | 2-4 years successful sales experience preferably in the wireless, data and/or telecommunications industry with a proven record of accomplishment in meeting quota and solution selling/account management | N | B/M/A | Experienced (Non-Manager) |  |  |
| 66 | 7/16 | RMH Telecom Consultants | Telecom Consulting Professionals: Sales and Business Development | Bachelor's Degree | 5+ to 7 Years | N | E/Mgr | Manager (Manager/Super visor of Staff) | Temporary / Contract / Project(FT,PT) | 80,000 to 300,00 0 per year |
| 67 | 7/15 | Cypress Semiconductor | Technology Development Engineer | Bachelor's Degree | 2+ to 5 Years | N | Eng | Experienced (Non-Manager) | FT/1st(Day) |  |
| 68 | 7/15 | Clearwire | Network Deployment Project Manager - POP | Bachelor's Degree | 5+ to 7 Years | N | E/Mgr | Experienced (Non-Manager) | FT |  |
| 69 | 7/15 | Cypress Semiconductor | Quality Assurance Engineer Sr. | Bachelor's Degree | 2+ to 5 Years | N | Eng | Experienced (Non-Manager) | FT/1st(Day) |  |
| 70 | 7/15 | Cypress Semiconductor | Production Manager (Sort/Test) | BS/BA | 5-10 year's experience high volume Wafer Fab experience | N | A/D |  | FT |  |
| 71 | 7/15 | Intel | Austin CG Project Controls Mgr | advanced degree and/or certification in management or project management |  | N | E/Mgr |  | FT |  |
| 72 | 7/13 | Toshiba America Information Sy | Pre-Sales Engineer-Telephony Hardware-Reseller Channel-PBX, VOIP, Key Systems | Bachelor's Degree | 5+ to 7 Years | N | Eng | Experienced (Non-Manager) | FT/1st(Day) |  |

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| | Date | Company | Job Position | Requirement | Experience | Career Level Code | Job Position Classification | Career Level | Job Status /Shift | Salary (USD) |
|---|---|---|---|---|---|---|---|---|---|---|
| 73 | 7/13 | Intel | Component Design Engineer | Master of Science degree (or a Ph.D.) in Electrical Engineering or Computer Science | more than seven years of experience in design | N | Eng | | FT | |
| 74 | 7/12 | Novotus | Vice President, Sales and Marketing - Austin, TX | Bachelor's Degree | 10 + years sales and/or marketing experience.  5 + years sales management experience at an executive level preferably in the K-12 education system, and other public sector market segments | N | B/M/A | | FT | |
| 75 | 7/11 | Nextel Communications | Supervisor, Customer Lifecycle | Bachelor's degree or equivalent work experience. | 3 to 5 yrs management experience in call center or service environment. | N | O | | FT | |
| 76 | 7/8 | The Home Depot | MGR INFORMATION SERVICES - Help Desk L2 | Bachelor's degree in Computer Science or related field is preferred | Prior experience as a Help Desk Manager managing a team size of 50+ | N | E/Mgr | Experienced (Non-Manager) | FT | |
| 77 | 7/7 | Wayport Inc. | Sr. Oracle Developer - (Database Applications Programming, PL/SQL) | Bachelor's Degree | 5+ to 7 Years | N | R/A | Experienced (Non-Manager) | FT/1st(Day) | |
| 78 | 7/7 | Wayport Inc. | Software Engineer (C++, C#, Linux) | Bachelor's Degree | 2+ to 5 Years | N | Eng | Experienced (Non-Manager) | FT/1st(Day) | |
| 79 | 7/6 | Intelligent Technology | Manager of Technical Marketing for Power Products | BSEE or better | 2+ years experience in power supply or motor control design or applications engineering, + a minimum of 2 years experience in semiconductor marketing. | N | B/M/A | | FT | |

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| | Date | Company | Job Position | Requirement | Experience | Career Level Code | Job Position Classification | Career Level | Job Status /Shift | Salary (USD) |
|---|---|---|---|---|---|---|---|---|---|---|
| 80 | 7/1 | Nextel Communications | Supervisor, Credit | Bachelor's Degree | 3 - 5 yrs call center experience a plus. | N | O | | FT | |
| 81 | 6/30 | Company Confidential | Project Manager / Sr. Software Application and Services Engineer | Master's Degree | 2+ to 5 Years | N | E/Mgr | | FT/1st(Day) | |
| 82 | 6/27 | Nextel Communications | Store Manager in Training | | 2 years plus store manager experience preferably in a retail setting | N | B/M/A | | FT | |
| 83 | 6/27 | Freescale Semiconductor | CAD Software Engineer | Bachelor's Degree | 5+ to 7 Years | N | Eng | Experienced (Non-Manager) | FT/1st(Day) | |
| 84 | 6/24 | Wireless Facilities, Inc. | Network Planning / Core Engineer | Bachelor's Degree | 5+ to 7 Years | N | Eng | Experienced (Non-Manager) | Temporary / Contract / Project(FT) | |
| 85 | 6/24 | Nextel Communications | Store Manager in Training | | 2 years plus store manager experience preferably in a retail setting | N | B/M/A | | FT | |
| 86 | 6/23 | Freescale Semiconductor | Processor Program Manager | BS in engineering or MBA | 5 years experience in semiconductor development & productization. | N | B/M/A | | FT/1st(Day) | |
| 87 | 6/23 | Xplore Technologies | Senior Sales Engineer – All Locations, US | BA/BS degree in Engineering or Computer Science (or equivalent experience considered), Microsoft OS certifications , Microsoft Network certifications , CompTia certification | 5 years sales engineering experience selling into the rugged mobile market space | N | Eng | | FT | |

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| | Date | Company | Job Position | Requirement | Experience | Career Level Code | Job Position Classification | Career Level | Job Status /Shift | Salary (USD) |
|---|---|---|---|---|---|---|---|---|---|---|
| 88 | 6/23 | Intel | AppsProcessor Platform Planner | Bachelor of Science degree in Engineering or Computer Science, or an M.B.A. | 3 years of experience in a planning role and experience in the cellular market segment | N | B/M/A | | FT | |
| 89 | 6/23 | SBC Communications | Principal Member of Technical Staff | Bachelor's Degree | More than 5 years | N | Tech2 | | FT | |
| 90 | 6/23 | Freescale Semiconductor | Contracts Manager - Legal | Master's Degree | 5+ to 7 Years | N | E/Mgr | Experienced (Non-Manager) | FT/1st(Day) | |
| 91 | 6/23 | ETS-Lindgren | Windows Applications Developer | Bachelor's Degree | 2+ to 5 Years | N | Tech2 | Experienced (Non-Manager) | FT/1st(Day) | |
| 92 | 6/21 | Freescale Semiconductor | PHX MES-UI Applications Engineer | Bachelor's Degree | 5+ to 7 Years | N | Eng | Experienced (Non-Manager) | FT/1st(Day) | |
| 93 | 6/17 | Intelligent Technology | Product Marketing Manager-Wireless(GSM/GPRS,3G) | BSEE or better | 5+ years of experience as a Product Manager or Applications Engineer focused on analog/mixed-signal ICs. Experience with one or more of the following wireless technologies is required: GSM, GPRS, or 3G | N | B/M/A | | FT | |
| 94 | 6/17 | Wireless Connection/Nextel | Account Executive | Some College Coursework Completed | 1+ to 2 Years | N | B/M/A | Experienced (Non-Manager) | FT/1st(Day) | |
| 95 | 6/17 | Wayport Inc. | Sr. Product Manager - Marketing | Bachelor's Degree | 10+ to 15 Years | N | B/M/A | Manager (Manager/Supervisor of Staff) | FT/1st(Day) | |
| 96 | 6/17 | Freescale Semiconductor | R&D Product / Test Engineer | Bachelor's Degree | 5+ to 7 Years | N | R/A | Experienced (Non-Manager) | FT/1st(Day) | |
| 97 | 6/17 | Freescale Semiconductor | NVM Memory Designer | Bachelor's Degree | 5+ to 7 Years | N | R/A | Experienced (Non-Manager) | FT/1st(Day) | |
| 98 | 6/17 | Freescale Semiconductor | NVM Reliability Engineer | Bachelor's Degree | 5+ to 7 Years | N | Eng | Experienced (Non-Manager) | FT/1st(Day) | |

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|---|---|---|---|---|---|---|---|---|---|---|
| 99 | 6/17 | Freescale Semiconductor | NVM RTL Designer | Bachelor's Degree | 5+ to 7 Years | N | R/A | Experienced (Non-Manager) | FT/1st(Day) | |
| 100 | 6/16 | Intel | Pre-Si Design Verification | Bachelor or Master of Science degree in appropriate field | More than 3 years experience designing and/or testing VLSI components and systems. Verilog* or VHDL coding, modelsim simulator, C/C++, PERL, Proto/Coral*, strong UNIX* proficiency, ARM* architecture, demonstrated team leadership skills, and start to finish experience on one or more development projects | N | R/A | | FT/1st(Day) | |
| 101 | 6/16 | TX Comptroller of Public Accounts | System Analyst VI/VOIP Analyst | Bachelor's Degree | 7+ to 10 Years | N | R/A | Experienced (Non-Manager) | FT/1st(Day) | 4,985 to 6,093 per month |
| 102 | 6/16 | The Home Depot | ARCHITECT IT - Call Center Solutions | MS Degree | 10 years of related experience | N | E/Mgr | Experienced (Non-Manager) | FT | |
| 103 | 6/15 | Dell, Inc. | Wireless Systems Engineering Sr. Manager I | | Proven track record of delivering products in established wireless technologies and knowledge of emerging trends: WWAN -- CDMA and GSM,WLAN -- 802.11 and relevant security protocols, WPAN -- Bluetooth | N | E/Mgr | | FT | |
| 104 | 6/15 | Verizon Wireless | National Accounts Manager | Bachelor's Degree or equivalent work experience required. | 5-7 years of outside sales/account management experience required preferably with emphasis on major/national accounts | N | E/Mgr | | FT | |

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| | Date | Company | Job Position | Requirement | Experience | Career Level Code | Job Position Classification | Career Level | Job Status /Shift | Salary (USD) |
|---|---|---|---|---|---|---|---|---|---|---|
| 105 | 6/14 | Alereon | Lead Validation Design Engineer | Bachelor's Degree | 10+ to 15 Years | N | Eng | Experienced (Non-Manager) | FT/1st(Day) | |
| 106 | 6/14 | Alereon | Sr RF IC Design Engineer | Master's Degree | 7+ to 10 Years | N | Eng | Experienced (Non-Manager) | FT/1st(Day) | |
| 107 | 6/14 | Company Confidential | Installation, Training and Documentation Manager | Bachelor's degree | or six years related experience | N | E/Mgr | | FT | |
| 108 | 6/14 | Intelligent Technology | SR Mixed Signal IC Test/Product Engineer - Microcontrollers | BSEE or better(MSEE preferred) | 5 or more years of experience in Mixed Signal microcontroller Test, or Applications Engineering | N | R/A | | FT | |
| 109 | 6/14 | Intelligent Technology | SR Embedded Software/Firmware Developer- Modems | BS(MS preferred) in EE or CS | Strong C++, Python, Perl and assembly coding. 5+ years in semiconductor or communications embedded firmware development in one or more of the following areas: (embedded systems with modems or networking, Modem or communications code development, Telephone or communication system software design, Ethernet or HPNA product development | N | Eng | | FT | |
| 110 | 6/14 | Intelligent Technology | SR RF Applications Engineer-board design | BSEE(MSEE preferred) | 3-5 years of RF semiconductor or RF board level design experience | N | Eng | | FT | |
| 111 | 6/14 | Intelligent Technology | Applications Engineer-board level mixed signal | BSEE or better(MSEE preferred) | 3+ years experience in hardware/software mixed signal system engineering or semiconductor applications engineering. | N | Eng | | FT | |
| 112 | 6/13 | @hand Corporation | Solutions Engineer - Mobile/Wireless | Bachelor's Degree | 2+ to 5 Years | N | Eng | Experienced (Non-Manager) | FT | |

R=Relevant for WorkSource,P=Possibly relevant, N=Not Relevant   Tech2=CustomerSupport/IT Technician,R/A=Research/Analyst,A/D=Assembly/Distribution,B/M/A=Business/Marketing/Administrative, Eng=Engineer,E/Mgr=Executive/Manager,O=Others

| | Date | Company | Job Position | Requirement | Experience | Career Level Code | Job Position Classification | Career Level | Job Status /Shift | Salary (USD) |
|---|---|---|---|---|---|---|---|---|---|---|
| 113 | 6/13 | Freescale Semiconductor | Finance IT Controls Specialist | Bachelor's Degree | 7+ to 10 Years | N | B/M/A | Experienced (Non-Manager) | FT | 90,000 to 115,000 per year |
| 114 | 6/13 | Freescale Semiconductor | Finance IT Controls Specialist | Bachelor's Degree | 7+ to 10 Years | N | B/M/A | Experienced (Non-Manager) | FT | 90,000 to 115,000 per year |
| 115 | 6/13 | SBC Communications | Principle Member of Technical Staff | Bachelor's Degree | More than 5 years | N | Tech2 | | FT | |
| 116 | 6/10 | Uptown Recruiting | Corporate Account Executive | Bachelor's Degree | 2+ to 5 Years | N | B/M/A | Experienced (Non-Manager) | FT | |
| 117 | 6/8 | Intelligent Technology | SR Digital IC Design Engineer | MSEE or PhD preferred | 5-10 years of Digital ASIC design experience | N | Eng | | FT | |
| 118 | 6/8 | Intelligent Technology | Lead/Prime Analog Mixed Signal IC Designer | MSEE, OR PhD in EE (preferred). | 8+ years experience in analog CMOS IC design for signal processing | N | R/A | | FT | |
| 119 | 6/8 | Intelligent Technology | Digital Systems Architect/Algorithm Developer for RF com applications | MSEE; PhD in EE (preferred) | 5+ years of industry experience in system modeling and digital design for RF communications projects | N | R/A | | FT | |
| 120 | 6/6 | Freescale Semiconductor | Wireless Security Software Architect | Master's Degree | 7+ to 10 Years | N | R/A | Manager (Manager/Supervisor of Staff) | FT/1st(Day) | |
| 121 | 6/3 | Company Confidential | IT Generalist | Bachelor's Degree | 2+ to 5 Years | N | Tech2 | Experienced (Non-Manager) | FT | |
| 122 | 6/2 | Intelligent Technology | Embedded Software/Firmware Engineers - all levels - Microcontroller experience, | BSCS, BSCE, or BSEE | Excellent writing and debugging in C and assembly. 5+ years real time embedded system software core design experience | N | Eng | | FT | |
| 123 | 6/1 | QUALCOMM | RFIC Design Engineers-Austin Design Center | Bachelor's Degree | 2+ to 5 Years | N | Eng | Experienced (Non-Manager) | FT | |
| 124 | 5/31 | Sprint | Retail Management Positions * San Antonio Area | | | N | E/Mgr | | | |

R=Relevant for WorkSource,P=Possibly relevant, N=Not Relevant   Tech2=CustomerSupport/IT Technician,R/A=Research/Analyst,A/D=Assembly/Distribution,B/M/A=Business/Marketing/Administrative, Eng=Engineer,E/Mgr=Executive/Manager,O=Others

|  | Date | Company | Job Position | Requirement | Experience | Career Level Code | Job Position Classification | Career Level | Job Status /Shift | Salary (USD) |
|---|---|---|---|---|---|---|---|---|---|---|
| 125 | 5/31 | Sprint | Retail Management Positions * Austin area |  |  | N | E/Mgr |  |  |  |
| 126 | 5/30 | The Mobile Solution | Market Recruiter |  |  | N | B/M/A |  | FT |  |
| 127 | 5/30 | The Mobile Solution | Market Recruiter |  |  | N | B/M/A |  | FT |  |
| 128 | 5/30 | The Mobile Solution | Market Recruiter |  |  | N | B/M/A |  | FT |  |
| 129 | 5/27 | Novotus | Senior Electronics Engineer - Austin, TX | Bachelor's Degree in Electrical Engineering or equivalent | 8 years experience in digital and analog circuit design | N | Eng |  | FT |  |
| 130 | 5/27 | Novotus | Senior Firmware/Software Engineer - Austin, TX | BSEE, BSCS or equivalent | 5 years of experience developing (C/C++) real-time embedded applications. A minimum of 2 years developing complex multi-tasked network (UDP/TCP/IP) applications utilizing multiple sockets. A minimum of 3 years developing real-time embedded applications | N | Eng |  | FT |  |
| 131 | 5/27 | Fuddruckers, Inc. | SENIOR SYSTEMS ADMINISTRATOR | BS, CS or equivalency | 4+ years enterprise IT experience required with a MCSE. | N | B/M/A |  | FT/1st(Day) |  |
| 132 | 5/25 | Kelly Services | Bilingual Telemarketing Representative | Must be bilingual | 1+ to 2 Years | N | B/M/A | Experienced (Non-Manager) | Temporary/Contract/ Project(FT/1st( Day)) | 8 per hour |

R=Relevant for WorkSource,P=Possibly relevant, N=Not Relevant   Tech2=CustomerSupport/IT Technician,R/A=Research/Analyst,A/D=Assembly/Distribution,B/M/A=Business/Marketing/Administrative, Eng=Engineer,E/Mgr=Executive/Manager,O=Others

## Appendix C
## Texas Skill Standards Board - Certifications for the Telecommunications, Computers, Arts and Entertainment, and Information Industry Cluster

| | Occupation | Certification | Certification Contact |
|---|---|---|---|
| 1 | Multiple occupations | Multiple certifications | Computing Technology Industry Association (CompTIA)<br>Phone: 630-678-8300<br>Email: questions@comptia.org<br>Web:<br>http://www.tcc.comptia.org/certification.asp?section_type=curr_dev&sub_type=certification<br>CompTIA offers recent info on information and communications technology certifications. |
| 2 | Application Consultant | Certified SAP-R/3<br>Application Consultant: Accelerated SAP 2000 | SAP America, Inc.<br>Phone: 610-725-4500<br>Email: info.america@sap-ag.de<br>Web: www.sap-ag.de/education/certification |
| 3 | Application Developer | Certified Internet Webmaster Application Developer | Prosoft Training<br>Phone: 512-328-6140<br>Email: info@ProsoftTraining.com<br>Web: www.ProsoftTraining.com |
| 4 | Application Developer | IBM-Certified Application Developer for DB2 Platforms | IBM Corporation<br>Phone: 800-772-2227<br>Email: certify@us.ibm.com<br>Web: www-1.ibm.com/certify/index.shtml |
| 5 | Application Developer | Oracle-Certified Application Developer | Oracle Corporation<br>Phone: 800-633-0575<br>Web: www.education.oracle.com/education/certification |
| 6 | Associate Computing Professional | Certified Associate Computing Professional | Institute for Certification of Computing Professionals<br>Phone: 708-299-4227<br>Email: 74040.3722@compuserve.com<br>Web: www.iccp.org |
| 7 | Associate System Administrator | IBM-Certified System Administrator | IBM Corporation<br>Phone: 800-772-2227<br>Email: certify@us.ibm.com<br>Web: www-1.ibm.com/certify/index.shtml |
| 8 | Backup and Recovery Engineer | Sun-Certified Backup and Recovery Engineer | Sun Microsystems, Inc.<br>Phone: 800-422-8020<br>Web: www.sun.com |
| 9 | Broadband Communications Technician | Broadband Communications Technician (BCT®) | Society of Cable Telecommunications Engineers<br>Phone: 800-542-5040 or 610-363-6888<br>Email: hcooper@scte.org<br>Web: www.scte.org |

| | Occupation | Certification | Certification Contact |
|---|---|---|---|
| 10 | Broadband Distribution Specialist | Broadband Premises Specialist | Society of Cable Telecommunications Engineers<br>Phone: 800-542-5040 or 610-363-6888<br>Email: hcooper@scte.org<br>Web: www.scte.org |
| 11 | Broadband Premises Specialist | Broadband Premises Specialist | Society of Cable Telecommunications Engineers<br>Phone: 800-542-5040 or 610-363-6888<br>Email: hcooper@scte.org<br>Web: www.scte.org |
| 12 | Broadband Transport Specialist | Broadband Premises Specialist | Society of Cable Telecommunications Engineers<br>Phone: 800-542-5040 or 610-363-6888<br>Email: hcooper@scte.org<br>Web: www.scte.org |
| 13 | Cable Communications Specialist | Cisco-Certified Cable Communications Specialist 1 | Cisco Systems<br>Phone: 800-553-NETS or 408-526-4000<br>Email: jobs@cisco.com<br>Web: www.cisco.com |
| 14 | Computer Service Technician | A+ , CDIA+, CTT+, e-Biz+, i-Net+, Linux+, Security+, Server+ Certifications | Computing Technology Industry Association<br>Phone: 630-268-1818<br>Email: info@comptia.org<br>Web: www.comptia.org |
| 15 | Computer Service Technician | Computer Service Technician (CST) | Electronics Technicians Association, International<br>Phone: 800-288-3824 or 765-653-8262<br>Email: eta@indy.tdsnet.com<br>Web: www.eta-sda.com |
| 16 | Computing Professional | Associate Computing Professional (ACP) | Institute for Certification of Computing Professionals<br>Phone: 708-299-4227<br>Email: office@iccp.org<br>Web: www.iccp.org |
| 17 | Computing Professional | Certified Computing Professional (CCP) | Institute for Certification of Computing Professionals<br>Phone: 708-299-4227<br>Email: office@iccp.org<br>Web: www.iccp.org |
| 18 | Convergent Network Technologies Professional | Certification in Convergent Network Technologies (CCNT) | TIA/Prosoft Training<br>Phone: 800-995-LEARN (5327)<br>Email: info@ctpcertified.com<br>Web: www.ctpcertified.com |

|  | Occupation | Certification | Certification Contact |
|---|---|---|---|
| 19 | Convergent Technologies Professional | Convergence Technologies Professional (CTP) Certification | TIA/Prosoft Training<br>Phone: 800-995-LEARN (5327)<br>Email: info@ctpcertified.com<br>Web: www.ctpcertified.com |
| 20 | Customer Service Specialist, Electronics | Customer Service Specialist (CSS) | Electronics Technicians Association, International<br>Phone: 800-288-3824 or 765-653-8262<br>Email: eta@indy.tdsnet.com<br>Web: www.eta-sda.com |
| 21 | Database Administrator | Microsoft-Certified Database Administrator | Microsoft Corporation<br>Phone: 800-426-9400 or 425-882-8080<br>Web: www.microsoft.com/technet/training/default.asp |
| 22 | Database Administrator | Oracle8i, Oracle9i Database Administrator | Oracle University<br>Phone: 800-633-0575<br>Web: education.oracle.com |
| 23 | Data Cabling Technician | Data Cabling (DCIC) | Electronics Technicians Association, International<br>Phone: 800-288-3824 or 765-653-8262<br>Email: eta@indy.tdsnet.com<br>Web: www.eta-sda.com |
| 24 | Data Management Engineer | Sun-Certified Data Management Engineer for Solaris Operating Environments | Sun Microsystems, Inc.<br>Phone: 800-422-8020<br>Email: webmaster@sun.com<br>Web: www.sun.com |
| 25 | Digital Imaging Technician, Expert | Certification in Composition | The National Council for Skill Standards in Graphic Communications, Harry V. Quadracci Printing & Graphics Center<br>Phone: 262-695-3470<br>Email: ekelley@ncssgc.org<br>Web: www.gain.net/training_meetings/ncss_exam.html |
| 26 | Digital Imaging Technician, Expert | Certification in Job Engineering | The National Council for Skill Standards in Graphic Communications, Harry V. Quadracci Printing & Graphics Center<br>Phone: 262-695-3470<br>Email: ekelley@ncssgc.org<br>Web: www.gain.net/training_meetings/ncss_exam.html |
| 27 | Digital Imaging Technician, Expert | Certification in Image Capture | The National Council for Skill Standards in Graphic Communications, Harry V. Quadracci Printing & Graphics Center<br>Phone: 262-695-3470<br>Email: ekelley@ncssgc.org<br>Web: www.gain.net/training_meetings/ncss_exam.html |

| | Occupation | Certification | Certification Contact |
|---|---|---|---|
| 28 | Digital Imaging Technician, Expert | Certification in Digital Output | The National Council for Skill Standards in Graphic Communications, Harry V. Quadracci Printing & Graphics Center<br>Phone: 262-695-3470<br>Email: ekelley@ncssgc.org<br>Web: www.gain.net/training_meetings/ncss_exam.html |
| 29 | Digital Imaging Technician, Expert | Master Certification | The National Council for Skill Standards in Graphic Communications, Harry V. Quadracci Printing & Graphics Center<br>Phone: 262-695-3470<br>Email: ekelley@ncssgc.org<br>Web: www.gain.net/training_meetings/ncss_exam.html |
| 30 | Document Imaging Architect | Certified Document Imaging Architect | Computing Technology Industry Association<br>Phone: 630-268-1818<br>Email: info@comptia.org<br>Web: www.comptia.org |
| 31 | E-Business Consultant | Implementation Consultant, Oracle 11i | Oracle University<br>Phone: 800-633-0575<br>Web: education.oracle.com |
| 32 | E-Commerce Designer | Certified Internet Webmaster E-Commerce Designer | Prosoft Training<br>Phone: 512-328-6140<br>Email: info@ProsoftTraining.com<br>Web: www.ProsoftTraining.com |
| 33 | Enterprise Architect | Sun-Certified Enterprise Architect for Java 2 Platform, Enterprise Edition Technology | Sun Microsystems, Inc.<br>Phone: 800-422-8020<br>Email: webmaster@sun.com<br>Web: www.sun.com |
| 34 | Enterprise Developer | IBM WebSphere Application Server, Advanced Single Server Edition for Multiplatforms, V4.0 | IBM Corporation<br>Phone: 800-772-2227<br>Email: certify@us.ibm.com or tivcert@us.ibm.com<br>Web: www-1.ibm.com/certify/index.shtml |
| 35 | Enterprise Developer | Certified Internet Webmaster Enterprise Developer | Prosoft Training<br>Phone: 512-328-6140<br>Email: info@ProsoftTraining.com<br>Web: www.ProsoftTraining.com |

| | Occupation | Certification | Certification Contact |
|---|---|---|---|
| 36 | Enterprise Integrator | Certified Enterprise Integrator | Society of Manufacturing Engineers<br>Phone: 800-733-4763 or 313-271-1500<br>Email: cert@sme.org<br>Web:   www.sme.org |
| 37 | Fiber Optic Technician | Certified Fiber Optic Specialist | The Fiber Optic Association, Inc.<br>Phone: 781-397-2400<br>Email: info@thefoa.org<br>Web:   www.thefoa.org |
| 38 | Fiber Optic Technician | Certified Fiber Optic Technician | The Fiber Optic Association, Inc.<br>Phone: 781-397-2400<br>Email: info@thefoa.org<br>Web:   www.thefoa.org |
| 39 | Fiber Optics Installer | Fiber Optics Installer (FOI) | Electronics Technicians Association, International<br>Phone: 800-288-3824 or 765-653-8262<br>Email: eta@indy.tdsnet.com<br>Web:   www.eta-sda.com |
| 40 | Firewall Specialist | Cisco-Certified Firewall Specialist | Cisco Systems<br>Phone: 800-553-NETS or 408-526-4000<br>Email: jobs@cisco.com<br>Web:   www.cisco.com |
| 41 | IC3 Specialist | Cisco-Certified Firewall Specialist | Certiport, Inc.<br>Phone: 888-222-7890<br>Email: services@certiport.com<br>Web:   www.certiport.com |
| 42 | Installer | Installer,<br>Levels 1-2 | BICSI World Headquarters, Telecommunications Cabling Installation Training Programs<br>Phone: 800-242-7405; 813-979-1991<br>Email: bicsi@bicsi.org<br>Web:   www.bicsi.com |
| 43 | Internet Architect | Novell-Certified Internet Architect | Novell, Inc.<br>Phone: 408-967-5000<br>Web:   www.novell.com |
| 44 | Internet Business Strategist | Novell-Certified Internet Business Strategist | Novell, Inc.<br>Phone: 408-967-5000<br>Web:   www.novell.com |
| 45 | Internet Professional | Novell-Certified Internet Professional | Novell, Inc.<br>Phone: 408-967-5000<br>Web:   www.novell.com |

|    | Occupation | Certification | Certification Contact |
|----|-----------|---------------|----------------------|
| 46 | Internet Security Professional | Certified Internet Webmaster Security Professional | Prosoft Training<br>Phone: 512-328-6140<br>Email: info@ProsoftTraining.com<br>Web: www.ProsoftTraining.com |
| 47 | Internet Webmaster Associate | Certified Internet Webmaster Associate | Prosoft Training<br>Phone: 512-328-6140<br>Email: info@ProsoftTraining.com<br>Web: www.ProsoftTraining.com |
| 48 | Internet-working Professional | Certified Internet Webmaster Internet-working Professional | Prosoft Training<br>Phone: 512-328-6140<br>Email: info@ProsoftTraining.com<br>Web: www.ProsoftTraining.com |
| 49 | Intranet Manager | Novell-Certified Intranet Manager | Novell, Inc.<br>Phone: 408-967-5000<br>Web: www.novell.com |
| 50 | IP Telephony Design Specialist | Cisco-Certified IP Telephony Design Specialist | Cisco Systems<br>Phone: 800-553-NETS or 408-526-4000<br>Email: jobs@cisco.com<br>Web: www.cisco.com |
| 51 | JAVA Developer | Oracle9i, J2EE JAVA Developer | Oracle University<br>Phone: 800-633-0575<br>Web: education.oracle.com |
| 52 | JAVA Programmer | IBM-Certified Programmer for JAVA 2 Platforms | IBM Corporation<br>Phone: 800-772-2227<br>Email: certify@us.ibm.com<br>Web: www-1.ibm.com/certify/index.shtml |
| 53 | JAVA Programmer | Sun-Certified Programmer for JAVA 2 Platforms | Sun Microsystems, Inc.<br>Phone: 800-422-8020<br>Email: webmaster@sun.com<br>Web: www.sun.com |
| 54 | Lotus Notes Application Developer | Certified Lotus Notes Application Developer | Lotus Development Corporation<br>Phone: 800-343-5414 or 617-577-8500<br>Email: supportweb@lotus.com<br>Web: www.lotus.com |
| 55 | Lotus Notes Specialist | Certified Lotus Notes Specialist | Lotus Development Corporation<br>Phone: 800-343-5414 or 617-577-8500<br>Email: supportweb@lotus.com<br>Web: www.lotus.com |

| | Occupation | Certification | Certification Contact |
|---|---|---|---|
| 56 | Lotus Notes System Administrator | Certified Lotus Notes System Administrator | Lotus Development Corporation<br>Phone: 800-343-5414 or 617-577-8500<br>Email: supportweb@lotus.com<br>Web: www.lotus.com |
| 57 | Microsoft Office Specialist | Microsoft Office User Specialist (MOUS) | Microsoft Corporation<br>Phone: 800-688-0496<br>Email: MSCTECNA@microsoft.com<br>Web: www.microsoft.com/traincert/ |
| 58 | Microsoft Office Specialist 2000 | Microsoft Office Specialist 2000 Certification | Microsoft Corporation<br>Phone: 800-688-0496<br>Email: MSCTECNA@microsoft.com<br>Web: www.microsoft.com/traincert/ |
| 59 | Microsoft Office Specialist XP | Microsoft Office Specialist XPCertification | Microsoft Corporation<br>Phone: 800-688-0496<br>Email: MSCTECNA@microsoft.com<br>Web: www.microsoft.com/traincert/ |
| 60 | Multicolor Web Offset Press Operator | National Council Certified Operator | National Council for Skill Standards in Graphic Communications<br>Phone: 207-985-9898<br>Email: BSmith@ncssgc.org<br>Web: www.gain.net/training_meetings/about_ncss.html?print=1& |
| 61 | Multiservice Switching Specialist | Cisco-Certified Multiservice Switching Specialist | Cisco Systems<br>Phone: 800-553-NETS or 408-526-4000<br>Email: jobs@cisco.com<br>Web: www.cisco.com |
| 62 | Network Administrator | Lucent-Certified Technical Expert: Associate Level | Lucent Technologies<br>Phone: 877-777-1646<br>Email: lcse@lucent.com<br>Web: www.lucent.com/certification |
| 63 | Network Administrator | Lucent-Certified Technical Expert:ATM Associate Level | Lucent Technologies<br>Phone: 877-777-1646<br>Email: lcse@lucent.com<br>Web: www.lucent.com/certification |
| 64 | Network Administrator | SUN Certified Network Administrator for Solaris Operating Environments | Sun Microsystems, Inc.<br>Phone: 800-422-8020<br>Email: webmaster@sun.com<br>Web: www.sun.com |

|  | Occupation | Certification | Certification Contact |
|---|---|---|---|
| 65 | Network Engineer | Novell-Certified Network Engineer | Novell, Inc.<br>Phone: 408-967-5000<br>Web:    www.novell.com |
| 66 | Network Security Specialist | Cisco-Certified Network Security Specialist (CCIE) | Cisco Systems<br>Phone: 800-553-NETS or 408-526-4000<br>Email:  jobs@cisco.com<br>Web:    www.cisco.com |
| 67 | Network Systems Technician | Certified Network Systems Technician (CNST) | Electronics Technicians Association, International<br>Phone: 800-288-3824 or 765-653-8262<br>Email:  eta@indy.tdsnet.com<br>Web:    www.eta-sda.com |
| 68 | Network Technician | A+, Linux+, Network+ Certification | Computing Technology Industry Association<br>Phone: 630-268-1818<br>Email:  info@comptia.org<br>Web:    www.comptia.org |
| 69 | Network Technician, Internet | i-Net+ Certification | Computing Technology Industry Association<br>Phone: 630-268-1818<br>Email:  info@comptia.org<br>Web:    www.comptia.org |
| 70 | Network Technician, Internet, Advanced | Server+ Certification | Computing Technology Industry Association<br>Phone: 630-268-1818<br>Email:  info@comptia.org<br>Web:    www.comptia.org |
| 71 | Personal Computer Service and Support Professional | Certified Professional – PC Service and Support | The Learning Tree, Inc.<br>Phone: 800-843-8733<br>Email:  uscourses@learningtree.com<br>Web:    www.learningtree.com |
| 72 | Professional Network Administrator | IBM-Certified Specialist – AS/400 Professional Network Administrator | IBM Corporation<br>Phone: 800-772-2227<br>Email:  certify@us.ibm.com<br>Web:    www-1.ibm.com/certify/index.shtml |
| 73 | Satellite System Technician | Certified Satellite Installer (CSI) | Electronics Technicians Association, International<br>Phone: 800-288-3824 or 765-653-8262<br>Email:  eta@indy.tdsnet.com<br>Web:    www.eta-sda.com |

| | Occupation | Certification | Certification Contact |
|---|---|---|---|
| 74 | Server Administrator | Certified Internet Webmaster Server Administrator | Prosoft Training<br>Phone: 512-328-6140<br>Email: info@ProsoftTraining.com<br>Web: www.ProsoftTraining.com |
| 75 | Site Designer | Certified Internet Webmaster Site Designer | Prosoft Training<br>Phone: 512-328-6140<br>Email: info@ProsoftTraining.com<br>Web: www.ProsoftTraining.com |
| 76 | Small Dish Installer (Small DBS Earth Station/ TV Receive Only) | Registered Small Dish Installer | Electronics Technicians Association, International<br>Phone: 800-288-3824 or 765-653-8262<br>Email: eta@indy.tdsnet.com<br>Web: www.eta-sda.com |
| 77 | Software Engineer | Certified Professional – Software Engineering Practice | The Learning Tree, Inc.<br>Phone: 800-843-8733<br>Email: uscourses@learningtree.com<br>Web: www.learningtree.com |
| 78 | Software Engineer | Certified Professional – Software Engineering Process | The Learning Tree, Inc.<br>Phone: 800-843-8733<br>Email: uscourses@learningtree.com<br>Web: www.learningtree.com |
| 79 | Software Engineer | Certified Software Manager | Software Publishers Association<br>Phone: 800-388-7478<br>Email: csminfo@spa.org<br>Web: www.spa.org |
| 80 | Software Manager | Certified Software Manager | Software Publishers Association<br>Phone: 800-388-7478<br>Email: csminfo@spa.org<br>Web: www.spa.org |
| 81 | Solution Developer | Microsoft-Certified Solution Developer | Microsoft Corporation<br>Phone: 800-426-9400 or 425-882-8080<br>Web: www.microsoft.com/technet/training/default.asp |
| 82 | Solution Developer | Solution Developer | Sun Microsystems, Inc.<br>Phone: 800-422-8020<br>Email: webmaster@sun.com<br>Web: www.sun.com |

| | Occupation | Certification | Certification Contact |
|---|---|---|---|
| 83 | Solutions Associate | 3 Com-Certified Solutions Associate | 3 Com<br>Phone: 800-876-3266<br>Email:  MNS/Administrator@3com.com<br>Web:     www.3com.com/training/3comu/certification/index.html |
| 84 | Solutions Expert | 3 Com-Certified Solutions Expert | 3 Com<br>Phone: 800-876-3266<br>Email:  MNS/Administrator@3com.com<br>Web:     www.3com.com/training/3comu/certification/index.html |
| 85 | Systems Associate | 3 Com-Certified Systems Associate | 3 Com<br>Phone: 800-876-3266<br>Email:  MNS/Administrator@3com.com<br>Web:     www.3com.com/training/3comu/certification/index.html |
| 86 | Systems Engineer | Microsoft-Certified Systems Engineer | Microsoft Corporation<br>Phone: 800-426-9400 or 425-882-8080<br>Web:     www.microsoft.com/technet/training/default.asp |
| 87 | Systems Engineer | Microsoft-Certified Systems Engineer + Internet | Microsoft Corporation<br>Phone: 800-426-9400 or 425-882-8080<br>Web:     www.microsoft.com/technet/training/default.asp |
| 88 | Systems Expert | 3 Com-Certified Systems Expert | 3 Com<br>Phone: 800-876-3266<br>Email:  MNS/Administrator@3com.com<br>Web:     www.3com.com/training/3comu/certification/index.html |
| 89 | Technical Consultant | Certified SAP – R/3 Technical Consultant: Workflow 2000 | SAP America, Inc.<br>Phone: 610-725-4500<br>Email:  info.america@sap-ag.de<br>Web:www.exto3.sap.com/usa/education/certification/index.asp |
| 90 | Technical Consultant | Technical Consultant, Oracle 11i Applications Administrator | Oracle University<br>Phone: 800-633-0575<br>Web:     education.oracle.com |
| 91 | Telecommunications Installation & Maintenance Technician | Telecommunications Installation & Maintenance Technician | National Coalition for Telecommunications Education and Learning (NACTEL)<br>Web:     www.nactel.org |
| 92 | Telecommunications Technician | Telecommunications Technician | BICSI World Headquarters, Telecommunications Cabling Installation Training Programs<br>Phone: 800-242-7405; 813-979-1991<br>Email:  bicsi@bicsi.org<br>Web:     www.bicsi.com |

|    | Occupation | Certification | Certification Contact |
|----|------------|---------------|-----------------------|
| 93 | Telecommunications Technician | Telecommunications Technician, Class 1-4 | National Association of Radio and Telecommunications Engineers, Inc. (NARTE)<br>Phone: 508-533-8333; 800-89-NARTE<br>Email:  narte@narte.org<br>Web:     www.narte.org |
| 94 | Web Administrator | Web Administrator, Oracle9iAS, Release 2 | Oracle University<br>Phone: 800-633-0575<br>Web:     education.oracle.com |
| 95 | Web Designer | Novell-Certified Web Developer | Novell, Inc.<br>Phone: 408-967-5000<br>Web:     www.novell.com |
| 96 | Web Developer | CIW Web Developer | jCert Initiative Offices<br>Phone: 714-245-7222<br>Web:     www.jcert.org |
| 97 | Web Developer | Novell-Certified Web Developer | Novell, Inc.<br>Phone: 408-967-5000<br>Web:     www.novell.com |
| 98 | Wireless LAN Design and Support Specialist | Cisco-Certified Wireless LAN Design and Support Specialist | Cisco Systems<br>Phone: 800-553-NETS or 408-526-4000<br>Email:  jobs@cisco.com<br>Web:     www.cisco.com |

*Source: Texas Skill Standards Board Certifications List, June 2003*

# Appendix D
## Training and Certifications Offered through the High Technology Institute at
## Austin Community College Continuing Education, Summer 2005

| Program | Program Description | Certificate Type |
|---|---|---|
| A+ | CompTIA A+ PC Technician. Prepares students for PC technician. 128 hour program for hardware & software courses. | Industry certification: CompTIA |
| ASQ | Prepares students for ASQ certification exams: CQA, CQE, CQT/CMI, CSQE & CSSBB | Industry certification: ASQ |
| AutoCAD | Prepares students to work in computer drafting. 16 to 32 hour programs. | Industry certification: AutoDesk |
| CCNA | Cisco Certified Network Associate. Prepares students to design, install, and manage local area network infrastructure. 280-hour program. | Industry certification: Cisco Systems |
| CCNP | Cisco Certified Network Professional. Prepares students to design, install and manage wide area networks. 280-hour program. | Industry certification: Cisco Systems |
| Cisco Network Security | This course prepares students to take the SECUR and CSPFA exams for the Cisco Firewall Specialist. 70-hour course. | Industry certification: Cisco Systems |
| CISSP | The course prepares students seeking ISC2 CISSP certification to demonstrate proficiency in ISC2 Common Body of Knowledge (CBK). 48 hour program. | Industry certification: ISC2 |
| IT Project Management | Project Management Institute PMP & CAPM and CompTIA IT Project+ certifications. Prepares students to manage IT projects. 48 hours program | Industry certification: Project Management Institute & CompTIA |
| Linux+ | CompTIA Linux+ Administrator. Prepares students to administer Linux based computers. 40 hour program. | Industry certification: CompTIA |
| Red Hat Linux | Red Hat Certified Engineer (RHCE) prepares students for Red Hat Linux installation and configuration, system administration, network services, and security. 40 hour program. | Industry certification: Red Hat |
| Localization Generalist | Prepares students to work in high tech industry as a localization expert. 72 hour program. | Consortium of companies and organizations, including ACC |
| MCDBA | Microsoft Certified Database Administrator. Prepares students to administer Microsoft SQL Server databases. 192 hour program. | Industry certification: Microsoft |

| Program | Program Description | Certificate Type |
|---|---|---|
| MCSA | Microsoft Certified Systems Administrator. Prepares students to install, administer, and manage Windows computers and networks. 160 hour program. | Industry certification: Microsoft |
| MCSE | Microsoft Certified Systems Engineer. Prepares students to manage local and wide area networks. 120 hour program. | Industry certification: Microsoft |
| Network and Server Security | Advanced program in the following areas: Windows Administrator, Linux/Apache Administrator, Auditor, System Administrator, Professional | ACC Certificate |
| Network+ | CompTIA Network+ Technician. Prepares students to work as network technician. 60 hour program. | Industry certification: CompTIA |
| Oracle DBA OCA | Oracle Certified Associate. Prepares students to administer Oracle databases. 88 hour program. | Industry certification: Oracle Corp |
| Oracle DBA OCP | Oracle Certified Professional. Prepares students to Manage large scale Oracle databases. 88 hour program. | Industry certification: Oracle Corp |
| Oracle Developer | Prepares students to write program code that is optimized for Oracle data access. 144 hours. | Industry certification: Oracle Corp |
| SCA | Sun Certified Administrator. Prepares students to administer Sun Solaris computers. 112 hour program. | Industry certification: Sun |
| Server+ | CompTIA Server+ Technician. Prepares students to work as server technician. 60 hour program. | Industry certification: CompTIA |
| Video Game Development | Prepares students to design, program, animate and produce video games. | ACC Certificate |
| Webmaster | Prepares students to design and develop web sites. Approximately 200 hours. | ACC Certificate |

# Appendix E
## Profiles of Selected Sub-Baccalaureate Education and Training in Austin

**Virginia College at Austin**

The Virginia College at Austin is a private proprietary institution of higher education offering associate degrees and diploma courses.  In summer 2005, 591 students were enrolled in this institution in Austin.  Virginia college offers various programs in its Austin Campus that provide students training in foundational skills that can be used in a career in wireless field, including the following programs:

**Cisco Network Administration** (2-Year – Associate of Applied Science Degree): This program prepares students for Wide Area Network administration field.  It enables to learn to work with local and wide area networks and to troubleshoot problems in those networks and to operate, install, configure, troubleshoot, upgrade, and maintain microcomputers.

**Computer Network Technician** (1 Year – Diploma): This program prepares for a technical career in job fields such as computer network technician or microcomputer service and repair.  This also helps to learn skills to prepare to take the A+ and Network+ certification examinations.

**Linux Network Administration** (2-Year – Associate of Applied Science Degree): This program prepares for a technical career in the computer network administration field. This program prepares for A+, Network+, LCP, and LCA network and computer certifications.

**Microsoft Network Engineer** (2-Year – Associate of Applied Science Degree): This program prepares for a technical career in computer network engineering field.  It also prepares for Network+, MCP (Microsoft Certified Professional) and the MCSE (Microsoft Certified Systems Engineer) certifications.

**The Network Security** (2-Year – Associate of Applied Science Degree): This program teaches to construct a secure network, implement and manage corporate networks and implement network security measures.

**ITT Technical Institute at Austin**

The ITT Technical Institute at Austin offers associate degrees in applied science in the programs that are relevant to help train students develop foundational skills for jobs in the wireless field.  The **School of Information Technology** at the Austin campus of ITT Technical Institute offers associate degree programs in the following subjects:

**Computer Network Systems**: The Computer Network Systems option of the IT program helps to prepare to perform tasks associated with installing, upgrading and maintaining computer network systems in typical LAN/WAN environments.  This option explores a number of networking and internetworking technologies. Additional curriculum topics, investigated through classroom and laboratory experiences, include introductory computer programming, survey of operating systems, network design and implementation, network systems management and other related technical subjects.

**Software Applications & Programming**: The Software Applications and Programming option of the IT program helps to prepare to perform tasks associated with developing and modifying software applications. Additional curriculum topics, investigated through classroom and laboratory experiences, include programming languages and algorithms, database development and applications and other related technical subjects.

**Web Development**: The Web Development option of the IT program helps to prepare to perform tasks associated with designing, creating and maintaining Web sites. Additional curriculum topics, investigated through classroom and laboratory experiences, include Web authoring with appropriate scripting and/or coding tools, Web application of database technology and other related technical subjects.

The **School of Electronics Technology** at the Austin campus of ITT Technical Institute offers associate degree program in **Computer & Electronics Engineering Technology**: This program prepares for careers in a variety of entry-level positions in electronics and computer technology, such as aviation, communications, computers, consumer products, defense and research and development. This program acquaints students with certain circuits, systems and specialized techniques used in electronics and computer technology career fields and exposes students to a combination of classroom theory and practical application in a laboratory environment.

The **School of Drafting & Design** at the Austin campus of ITT Technical Institute offers associate degree program in **Multimedia**: The Multimedia option of the IT program helps to prepare to perform tasks associated with designing and creating interactive multimedia communications. Additional curriculum topics, investigated through classroom and laboratory experiences, include introductory computer programming, multimedia applications and other related technical subjects.

**Computer Drafting & Design**: The Computer Drafting and Design program is to helps to acquire the skills to enter the workplace as a versatile draftsperson able to make basic design decisions and capable of addressing the challenges of future technological advances in the drafting and design profession.

**CyberTex Company**

The CyberTex Company was founded as an Austin startup in 1999, offering a wide range of services in the IT sector, including vocational training, network support and software development.  CyberTex has recently expanded training to include other programs such as Medical Assisting and Wireless Networking.  Their aim is to provide training in state-of-the–art computer and medical technologies in a professional atmosphere, enabling students to launch successful careers in the 21st century corporate workplace. CyberTex provides marketable skills of high quality to students by analyzing market trends, by counseling with CEO's and by consulting with public agencies for workforce training. CyberTex teaches learners to enter the computer industry as well as existing employees who want to improve their computer skills. In addition, CyberTex has an on-site, Authorized Prometric Testing Center, so one can get trained and certified all at the same location.  CyberTex offers in-house as well as online training courses for various skill sets, including the following:

**CompTIA Certification Training:** CompTIA certification programs are the recognized industry standards for foundation-level information technology (IT) skills.  CyberTex offers the following CompTIA Certification training program:
-**A+ Training**
-**Network+ Training**

**Microsoft Certification Training:** The Microsoft Certified Professional (MCP) credential is for professionals who have the skills to successfully implement a Microsoft product or technology as part of a business solution in an organization.  CyberTex offers the following Microsoft Certification training programs:
-**MCSA Training**
-**MCSE Training**
-**MOS Training**

**CISCO Certification Training:**
-**CCNA Training**

**New Horizons Computer Learning Centers**

New Horizons Computer Learning Centers has grown since 1982 to become the largest independent IT training company worldwide. They claim to offer more courses, at more times and in more locations than any other company in the computer training industry.  New Horizons also claims to be the largest network provider for many technical and certification programs.  Its Austin training center offers the following technical and certification programs:

**Microsoft Training:**

> **Microsoft Certified Professional (MCP)**
>
> **Microsoft Certified Systems Administrator (MCSA)**
>
> **Microsoft Certified Application Developer (MCAD)**
>
> **Microsoft Certified Database Administrator (MCDBA)**
>
> **Microsoft Certified Desktop Support Technician (MCDST)**
>
> **Microsoft Certified Solution Developer (MCSD)**
>
> **Microsoft Certified Systems Engineer (MCSE)**
>
> **Microsoft Office Specialist (MOS)**

**CompTIA:**

> **CompTIA A+**
>
> **CompTIA Linux+**
>
> **CompTIA Network+**
>
> **CompTIA Project+**
>
> **CompTIA Security+**

**Cisco:** New Horizons offers several Cisco certification programs.

**Help Desk:** The New Horizons Help Desk package includes three certification tracks that help one to become an IT Support Professional: CompTIA's A+, Help Desk Institute's soft skills, and Microsoft's MCDST Certification.

**Information Security courses and certifications** include

> **Security Awareness Concepts and Practices**: An introduction to common security threats and issues, ways to counter them and application of security techniques to common job activities.
>
> **Security+ Certification**
>
> **Security Certified Network Professional Certification**(SCNP)
>
> **Security Certified Network Architect** (SCNA)
>
> **Certified Ethical Hacker:** This class immerses students in an interactive environment where they will learn how to scan, test, hack, and secure their own systems. Students then learn how intruders escalate privileges and what steps can be taken to secure a system.

**New Horizons Training for Certified Information Systems Security Professional Certification:** This course discusses the ten core subject areas fundamental to the understanding of security for CIOs, managers, and engineers.

**Microsoft Certified Systems Administrator on Windows Server 2003: Security Specialization:** The MCSA Security Certification identifies system administrators who specialize in managing, maintaining, and implementing security on the Microsoft platform and as part of a secure computing environment.

**Microsoft Certified Systems Engineer on Windows Server 2003: Security Specialization:** The MCSE Security Engineer on Microsoft Windows 2003 Certification distinguishes systems engineers who specialize in designing, planning, and implementing security on the Microsoft platform and as part of a secure computing environment.

**Linux:** the two leading vendor-neutral certifications for Linux: **Linux+** and **Linux Professional Institute** (LPI) Certification, and Novell's Linux Certification, Novell Certified Linux Professional.

**Citrix:** including preparation for certification tests as **Citrix Certified Administrator (CCA)**, **Citrix Certified Enterprise Administrator (CCEA**) and **Citrix Certified Integration Architect (CCIA).**

**Novell:** certification and testing for **Certified Novell Administrato**r **(CNA)**, **Certified Novell Engineer (CNE), and Master Certified Novell Engineer (Master CNE).**