



## **Instructional Program Review Summary 2005 - 06**

Instructional Area: Workforce Education

Department: Electronics and Applied Technologies

Discipline: Semiconductor Manufacturing Technology,  
Power Technology,  
Electronics Technician,  
Automation, Robotics & Control Technology,  
Computer Electronics/Telecommunications,  
Engineering Technology

February 1, 2006

## Instructional Program Review Summary

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NOTE: An external reviewer should not be required to refer to the documentation notebook to understand the Instructional Program Review

Summary. Rather, data should be clearly cited in the summary so that the reviewer can easily find the source documents if needed.

### **EXECUTIVE SUMMARY**

Use the following guidelines to provide a concise overview/summary of the program review contained in this report.

Write a brief description of the goals and objectives of the discipline.

The purpose of the Electronics and Applied Technologies Department is to offer students a friendly and high quality educational infrastructure where students can acquire skills and degrees in multiple high technology areas that lead to relatively high paying jobs and/or provide pathways to four-year university technology programs and in so doing, assist the region and state in attracting more employers. The department offers courses, Certificates, and Associate of Applied Science Degrees in Semiconductor Manufacturing Technology, Automation, Robotics, and Controls Technology, Computer Electronics / Telecommunications, Electronics Technician Technology, Power Technology, and Engineering Technology. Major Employers for these areas include Samsung, Applied Materials, National Instruments, Dell Computers, AMD, Spansion, Freescale Semiconductor, Austin Energy, LCRA, Sematech, Toyota, and many other mid-sized and small employers. These specialty areas cover skill sets required of technicians in the vast majority of the high technology employers of the region. The goals for 2006 are to implement a major marketing strategy that will inform people throughout the region (possibly also the state, depending on pending grants) of the college offerings and to assist them with their needs.

Overview of how the program review was conducted. The department underwent significant change from late 2004 through all of 2005. The Electronics department merged with the Semiconductor Manufacturing department. The Automation, Robotics and Controls program was reviewed, revamped and enhanced. By Spring 2005, five separate programs were united under the newly merged department: Computer Electronics/Telecommunications, Automation, Robotics, and Controls Technology, Semiconductor Manufacturing Technology, Electronics Technician and Engineering Technology; and a total review of the department's program offerings was initiated. The curriculum structure was changed from one of five individual programs to one with a common core and five specialty areas plus one additional program designed for students transferring to a technical degree program at a 4-year university. In 2005, the

department met with several groups of industry representatives officially for about 13 times to discuss a common electronics core and which courses it would comprise. The core which comprises a common set of electronics coursework required by all specialties was discussed several times with a final vote by industry representatives on the agreed core composition by the end of Summer 2005. Specialty areas, including course composition and specialty area names were also discussed and voted on during the time. By December 2005, many discussions and votes had occurred focusing on the core, the specialty courses, and all the one-year Certificates and Associate of Applied Science Degrees had been modified and/or created and approved by industry and by the ACC Curriculum Committee. From mid 2005 to late 2005, a new specialty area was also created in Power Technology. This specialty area was created in partnership with local utilities such as Austin Energy, LCRA, and Georgetown Utilities in order to create an educational infrastructure that would provide qualified employees for the next several years as these utilities stated that many of their 'baby boomer' employees were predicted to retire. Additionally, a SWOT analysis was performed on December 9, 2005 to further assist us in reviewing and improving our progress. The preceding sequence of events is provided because it lists the large amount of change that took place in the department and that information for this program review was largely acquired as a result of these events. Meaningful surveys should be implemented in one year after these changes to the Electronics curriculum (newly adopted degree plans effective with FY2007) in partnership with industry (Dec. 2006) and every year thereafter to assess progress, opportunities, and areas of improvement. This is especially important because the third part of change plan has not yet been implemented. It has been planned for 2006. The three parts of the change plan are 1) merge departments (logistics and personnel), 2) review and revise curriculum structure, degrees, courses with industry, and 3) properly market educational opportunities to community, region, and possibly state if some grants are acquired. Surveys to assess student needs such as preference of schedules should be done every semester.

## Summary of findings:

Progress on previous program review recommendations. Previous reviews provide some pertinent information in that they were created for smaller programs with more focused areas such as for only the semiconductor program/industry or for the electronics program at Northridge. Since the department's merger, its goals, responsibilities, and mission has changed. The scope in the mission of the department is much wider and its responsibilities and opportunities are also larger. In previous reviews it was recommended that we further develop relationships with industry partners in particular industries. In 2005, we officially met with partners from many high technology industries about 13 times and the meetings were well represented by many of the largest as well as mid-sized employers of the region. The meetings were well attended, attesting to the high support and dedication from the industry participants. Through the progression of the meetings, industry representatives in conjunction with ACC faculty and staff and other guests such as Capital Idea finalized the specialty area Certificates and Associate degrees. Further, at previous programs reviews, the possibility of merging programs was discussed. The idea was a result of a possible continuing downturn in the regional high tech sector. 2001 through 2004 dealt the worst downturn ever to the semiconductor industry, and other high tech sectors experienced similar hardships. In late 2004, a decision was made to merge. The physical merger started in the Fall of 2004 and by late 2005, faculty and staff had been reallocated, course offerings had been changed, curriculums had been reviewed and revised, and unity and stability had somewhat been reached. Further, first-year courses were to be offered at both north and south Austin campus locations (Northridge and Riverside, respectively) while second-year courses were to be offered at the Riverside campus where much of the advanced equipment was outfitted. Special exceptions were to be made for courses not being equipment-intensive and having large demand at the Northridge campus. At previous program reviews, it was recommended that current programs be reassessed, updated, and that new opportunities not be ignored. Some specific recommendations stated that the department "was missing important opportunities." As a result, the department decided to review all its programs with industry partners and decide what to do. As stated earlier, it changed its curricular structure from one of individual 'silo' programs to one of interdependent specialty areas that shared a common core of electronics coursework and allowed students to acquire multiple Associate of Applied Science degrees in related specialties with minimum commitment of student time. In so doing, the department also increased the chances that core courses (which everybody needed to take) would make and would be offered on different times and locations. By the end of 2005, the department had finalized the addition of the Robotics, Automation and Controls Technology degree specialty which was similar

to the Semiconductor Manufacturing Technology degree program, but had the benefit of targeting a much broader set of companies. Companies targeted were semiconductor, automotive, general manufacturing, research-oriented, pharmaceutical, and others. The department also initiated meetings in mid 2005 with some of the major power utilities in the area to possibly create a power specialty. By January 2006, the curriculum had been agreed to, the instructors assigned, students had signed up to the program, and the first classes were being offered, an incredible feat according to a reporter from a local newspaper, The Austin Business Journal. All this was in response to a previous recommendation to take advantage of opportunities. It is possible that opportunities such as these were not taken advantage of in the past because the departments were smaller, more focused on specific industries, and had less resources. Other opportunities arose when the Dean for the Division, Linda Smarzik and the Vice President of Workforce for ACC, Mike Midgley, recommended that the department apply for grants that would act as catalysts in making the department and the college prime for becoming a national or regional center of excellence in various high technology areas. In January 2006, the department applied for a grant to become a major supplier of nanotechnology education and training for the State of Texas, through the Governor's office and the Texas Workforce Commission. Therefore, the department responded well to previous recommendations that it take advantage of opportunity. Also, in so responding and acting, the department has grown to accept change better.

Program strengths. The success of these workforce specialty degrees are highly tied to industry demand for skilled employees. Fortunately, from the second part of 2005 to the present (January 2006), demand for skilled and degreed students is extremely high. Large area employers such as Samsung, Freescale, Applied Materials, Toyota, and National Instruments have been hiring heavily. They have contacted the program on numerous occasions and hired its graduates. Unfortunately, the department can not keep up with demand. The challenge is that from 2001 to 2004, students went on study other areas, such as nursing, and so the pipeline in high technology programs suffered. The department is stepping up efforts to recruit from high schools, the community, and from within the college, but the programs are not automatic and the Associate of Applied Science degree takes about two years to complete, full time. Other program strengths include a well-credentialed faculty with industry experience in the different areas. Further, the department has a very impressive facility at the Riverside campus with machines, robots, and devices that are used for extensive hands-on training. The machines and equipment, for the most part, were donated by industry and so reflect well industry needs. Further, companies such as Applied Materials train some of their customers from Asia, Europe and the United States on the P-5000

(a popular semiconductor machine platform used around the world at semiconductor facilities) we have installed at our ACC Riverside campus facility. Another strength is the flexibility and commonality of the curriculum specialties based on one common core. It provides students time to decide which specialty to choose and it also allows them to acquire multiple Associate of Applied Science degrees by simply taking a few additional specialty courses, since the core requirement remains the same. Another significant strength of the program is the strong partnerships with industry and others that it has developed over the years. These partnerships have yielded many scholarships for students, jobs to graduates, and now internships. Industry partners have repeatedly stated their appreciation for ACC and the department in allowing them to be part of the review and redesign of the curriculum and focus areas. Further, recent employers have provided very positive feedback on recent hires. For example, the manager for human resources at Samsung, has stated that he really needs to be told when the next set of graduates are available because the recent graduates that they hired have been very impressive. Likewise the human resource manager of Austin Energy has been very pleased with the speed and effectiveness of the creation of the Power Technology program. He stated at an ACC meeting that ACC had done everything they were asked and more. However, when the SWOT analysis was performed in December 2005, curriculum was criticized as needing many changes. It must be noted that at the SWOT meeting there were no students and only one person representing industry. The remaining seven members were faculty. The responses from the person representing industry did not correspond with the responses from the full-time faculty in attendance. The faculty felt like many things were not going correctly and that many changes needed to occur.

Areas for improvement. From the meetings with industry, it was agreed that the first thing was to update the curriculums and the courses required within the different specialties. Then, it was agreed that an aggressive marketing strategy needed to be implemented. However, the responses from the SWOT yielded very different responses. The SWOT analysis had zero students and only one member from the business community. It was composed of six full-time faculty members, one adjunct instructor, and one person from industry. A SWOT analysis with students in the different specialty areas, industry representatives from the different industries, and more faculty would have provided a more representative analysis of the department. A definite area of improvement is to make sure that any future SWOT analysis and all upcoming surveys are well represented by all parties affected (industry, students, faculty). The SWOT analysis yielded areas of improvement such as the need for better management, the need for a better curriculum, and the need for industry representatives that would really know what is going on and needs to be done. Further, the SWOT analysis did note that student assessment

needs to take place and that marketing needs to occur. Further, some comments were made that some faculty were not motivated and that they needed to get more involved in student issues such as recruiting and more involved with industry representatives.

Key planning issues. The major key planning issues for 2006 revolve around marketing. Now that the curriculums have been completed; now that the department has a fixed product created and supported by industry, the department will implement a major marketing strategy that will first focus on three areas. 1) marketing to high school students via high school visitations and presentations to students, teachers, counselors, and administrators, 2) marketing to current ACC students at all campuses via flyers and various forms on in-house marketing, and 3) marketing to others via a newly created website heavily supported by Dean, and in additional forms such as radio, publicity, and other forms. In addition, much more input and time will be required of all faculty and staff in marketing efforts, as well as, in creating and administering more surveys now that the department has merged and specialty areas are completed. Also, monthly departmental meetings will also be used so that faculty and staff members can provide updates and mini presentations on what they do and what projects they are working on. This will further unify the department to a more focused and united vision. An area that we are considering implementing is some more help in student job placement. Other educational institutions that compete with the department such as ITT, DeVry, and Virginia College perform and heavily market their job placement capacity as it is a significant selling point to many potential students. This activity will not be very difficult because this job is now being started. Two of the six specialty areas (Automation, Robotics and Controls Technology specialty and the Power Technology specialty, the two most recent specialty degree areas) now have internships as part of the curriculum and therefore all its students will have to work before they graduate. Internships are extremely positive predecessors to highly successful job placement. Students acquire experience and knowledge and companies get to know their prospective future permanent employees.

Conclusions: What are the major conclusions regarding the present state of the program?

The program has recently undergone a heavy state of transition by merging, recreating its curriculum structure, updating its Certificates and Associates of Applied Science, and by bringing together all its different industry partners to see how it could meet the diverse needs of the companies, industries and the students. Further, the program has merged personnel from different specialty areas and with very different perspectives as to what needs to be done.

However, there is consensus from the faculty and staff, from the administration, and from the industry partners that the department needs to design and implement a comprehensive marketing strategy. The timing is very good because the hiring climate is currently very positive as many companies are experiencing a major 'ramp' in production and sales. As mentioned earlier, the department is constantly being contacted for graduates in a time when students are few and internships and jobs are abundant. From 2000 to 2004, the semiconductor program and the electronics program were both undergoing major difficulties as the high technology industry was experiencing its worst downturn on record and layoffs or hiring freezes were the norm. Every semester, enrollment continued to dwindle as the layoffs continued. These changes forced us to rethink and retool what we were teaching. As a result, we now have a much more updated set of specialty programs responsive to today's industry needs that students can take advantage of and that lead to relatively high paying jobs in this region and nationally. Presently, we have very good specialty areas, great facilities, experienced faculty and staff, SACS-accredited degrees, relatively low tuition costs, and relatively good equipment. Where we come short is in marketing. The community in general is still not aware that we exist; when people become aware, they are very impressed and surprised. Marketing is currently our largest challenge, but also our biggest opportunity. As for the demand and hiring of students, the department is not currently meeting the numbers demanded by industry; there are more jobs than graduating students. Further, even though the curriculum has undergone major change, it will most likely change again, as it should in any workforce program, especially in high technology.

Recommend future directions for the program based on this review:

- Expand services
- Maintain services
- Reduce services
- Close program

Recommendations: Summarize the self-study's recommended actions for improving the quality of the program.

The department needs to finalize its marketing strategy and implement. It should include: 1) high school student marketing, 2) ACC students marketing (at all campuses), and 3) general community marketing (via new and more effective website and other means). The department should also acquire more information on student needs and outcomes and provide student services of high value to students such as job placement. This is a very important function because decisions should be based on data, but it must be 'valid' data. Valid data on a new department that just merged, recreated and updated its curriculum, and is about to implement a marketing strategy, will now begin to be available. For example, how can students assess the benefits of a new curriculum structure that they have just heard about and have not experienced or

how can industry assess the effectiveness of the new core relative to new hires if it is only now about to be implemented. Further, faculty, staff, and administration can have a much more accurate assessment of changes once they have been tried. In addition, the department needs to have monthly meetings where faculty and staff provide presentations to others about what they do/teach (specialty areas/projects). These meetings are critical to help keep everybody in the department aware of what others are doing and to keep it united. Unity of the department is critical to its success. The department should continue to work extensively with industry partners to insure that specialty areas are keeping up with ever-changing technology advancements and needs. In addition, the department should continue to work with state agencies, chambers of commerce, and industry to insure that it takes advantage of other specialty areas that arise and need significant training such as nanotechnology, wireless, etc. As this report was being written, other specialty areas and functions were pending, depending on the outcome of some grants that the department has participated.

### SELF-STUDY TEAM PARTICIPANTS

List the names of people who participated in the review and their association with your program.

Name Hector Aguilar                       ACC Faculty             Industry Representative  
 Student

Name Linton Brooks                       ACC Faculty             Industry Representative  
 Student

Name Ronnie Wilson                       ACC Faculty             Industry Representative  
 Student

Name Kurt Nalty                       ACC Faculty             Industry Representative   
Student

Name Jesus Casas                       ACC Faculty             Industry Representative   
Student

Name Alberto Quinonez                       ACC Faculty             Industry Representative  
 Student

Name Louis Frenzel                       ACC Faculty             Industry Representative  
 Student

Name Pat Alba                       ACC Faculty             Industry Representative   
Student

Name Linda Smarzik                       ACC Faculty             Industry Representative  
 Student

### PROGRAM DESCRIPTION

Provide a brief description of the overall history, major developments and current objectives for your program (limit to 500 words).

The purpose of the Electronics and Applied Technologies Department is to offer students a friendly and high quality educational infrastructure where students can acquire skills and degrees in multiple high technology areas that lead to relatively high paying jobs and/or provide pathways to four-year university technology programs and in so doing, assist the region and state in attracting more employers. The department offers courses, Certificates, and Associate of Applied Science Degrees in Semiconductor Manufacturing Technology, Automation, Robotics, and Controls Technology, Computer Electronics and Telecommunications, Electronic Technician Technology, Power Technology, and Engineering Technology. Major Employers for these areas include Samsung, Applied Materials, National Instruments, Dell Computers, AMD, Spansion,

Freescale Semiconductor, Austin Energy, LCRA, Sematech, Toyota, and many other mid-sized and small employers. These specialty areas cover skill sets required of technicians in the vast majority of the high technology employers of the region.

### **STRENGTHS, WEAKNESSES, OPPORTUNITIES, THREATS (SWOT)**

List the names of people who participated in the SWOT and their association with your program.

Name Hector Aguilar                       ACC Faculty       Industry Representative  
 Student

Name Pat Alba                               ACC Faculty       Industry Representative  
 Student

Name Kurt Nalty                             ACC Faculty       Industry Representative  
 Student

Name Linton Brooks                       ACC Faculty       Industry Representative  
 Student

Name Ronnie Wilson                       ACC Faculty       Industry Representative  
 Student

Name Jesus Casas                         ACC Faculty       Industry Representative  
 Student

Name Alberto Quinonez  
 ACC Faculty       Industry Representative       Student

Summarize the findings of the SWOT analysis. Focus on the top 5 or 6 issues and answer the following questions:

**Strengths:** In what does your program excel?

Current job placement is very positive, many industry partnerships, exceptional facilities and equipment resources, an updated and accredited curriculum.

**Weaknesses:** What are the aspects of your program, which, if not addressed, will impede the area's future?

Marketing, student tracking after graduation and before entering program, management, broader faculty engagement and motivation in recruitment efforts.

**Opportunities:** What factors does your program need to take advantage of in order to enhance the quality of the area?

Marketing and advertising, curriculum can continuously be updated, offer student services such as job placement, continue and increase partnerships with industry

and with other entities such as state and local, involve faculty in many more initiatives such as high school recruiting and helping with advising, increase student internship opportunities given the much better industry outlook, work with industry partners on additional projects such as Dell student project. However, 2006 should focus intensively on the marketing plan for the whole department.

**Threats:** What are the external factors that could negatively impact your program's future?

Significant economic or industry downturn. Diversification into areas such as power utilities would lessen the impact, but a serious tech downturn would affect the department very significantly.

Discuss changes from the program's previous SWOT analysis.

In one of the previous SWOT analysis, it was stated that opportunities were not being capitalized on. Since then, a new Automation, Robotics, and Controls Technology program was created and implemented, a new Power Technology program has been created and is now being implemented, the different electronics-based programs have been merged and a new curriculum structure and degree plans created with industry input. It was also stated that maybe the semiconductor program needed to cover more areas (before merger); it was, the sister robotics/automation program was born. At previous SWOT meetings, the economy and the health of the high tech sector were mentioned as critical for the program's success. However, that was acknowledged as out of control of ACC. Fortunately, the tech sector has improved dramatically and there are strong possibilities that additional high tech employers may expand in Austin such as Samsung. If so, opportunities will be much broader. Since then, Samsung has expanded their manufacturing facilities with a \$500 million addition, Toyota has chosen San Antonio for a new truck plant, and there are rumors of more companies also possible moving to Central Texas.

## ANALYSIS

**[a] Relevance of the program to College mission and desired ends**

**Mission:**

Review the program's purpose statement. Verify that the statement is current and accurate and reflects the mission of the college as a whole or update the purpose statement.

The Self-Study team reviewed the program purpose statement and found (select one):

The purpose statement is current, accurate, and reflects the mission of the college. Enter the program's purpose statement: The purpose of the Electronics and Applied Technologies Department is to offer students a friendly and high quality educational infrastructure where students can acquire skills and degrees in multiple high technology areas that lead to relatively high paying jobs and/or

provide pathways to four-year university technology programs and in so doing, assist the region and state in attracting more employers.

The purpose statement was revised as shown below (enter the revised purpose statement):

**Intended Outcomes (Board Policy A-2. Intended Outcomes)**

How well does the program support the intended outcomes of the college to “ensure a quality return on the public’s investment in its community college district?”

The department has done relatively well in graduating students with both an Associate of Applied Science Degree in Electronics and in acquiring a Certificate. According to the ACC 2004-2005 Factbook, Electronics (which included Semiconductors) awarded 268 Associate of Applied Science degrees and 147 Certificates from 1999 to 2004. The ACC 2000-2004 Factbook listed 42 different workforce Associate of Applied Science degrees. Of the 42 different workforce AAS degrees awarded, only Nursing awarded more AAS degrees than Electronics for the time period between 1999 and 2004. Data from the Office of Institutional Effectiveness states that students who were employed after graduation in the Fall of 2001 were 9.4%. This data listed 90 different declared majors and of those, Electronics ranked number 71 out of 90 in percent of having a job upon graduation. These numbers are good considering that in the Fall of 2001, the high tech industry was laying off many people. Further, recent graduates from the now merged department were hired and in high demand as the high technology sector was hiring heavily. Of the seven students that graduated with an AAS degree in the summer of 2005, six immediately acquired jobs at different large high technology companies and one transferred to Texas A&M Kingsville University to go on for a four year Technology degree.

In what ways does the program encourage students to become lifelong learners?

The program offers multiple specialty areas that are all based on a large common core set of courses. Therefore, it is easy and fast for students to acquire a second Associate of Applied Science degree in a sister or a related area because the core is the same. Many students like this option because it provides them with additional and/or advanced skills. Further, the department offers courses in the mornings, afternoons, early evenings, and late evenings to encourage working students to continue their life-long education. In addition, the department has facilitated the process for students with Bachelors, Masters, and PhDs in related fields to easily register for specific courses of interest by having a dedicated student advisor. Similar facilities have been provided for experienced students in related fields. The student advisor has been very helpful with this endeavor. Further, the department has expanded into emerging and expanding fields recently which has attracted people to take courses who already have degrees and in many instances already work for a high technology firm. Such expansions are

Robotics, Automation, and Controls Technology and Power Technology. Recent developments indicate that the department may enhance its Semiconductor Manufacturing Technology specialty by adding Nanotechnology which is very related.

In what ways does the program provide accessible and affordable services for all who qualify and have the ability to benefit?

ACC's electronics-based two-year Associate of Applied Science degrees have a tuition, fees, and books total in-district cost approximating \$3,600 (for the two years). Other similar peers in the Austin area offering two-year electronics degrees (that may or may not be SACS accredited) cost between \$30,000, and in some cases more than \$50,000 for the two-year degree. In some cases, ACC electronics students are earning a two-year Associate of Applied Science degree accredited by SACS for a tenth of the expense of other local training programs. Further, ACC offers special services for people with special needs at all their six campuses (Office of Students with Disabilities). In addition to ACC offering student tutoring in general topics at all campuses, the Electronics and Applied Technologies department has its own set of tutors that cover all specialty areas and are available throughout the week and at different time frames at both the Riverside and Northridge campus. In addition, the department has a very strong working relationship with organizations such as Capital Idea who assist students with financial need by paying their tuition/fees/books, assisting with transportation if needed, assisting with childcare if needed, and in providing on-going counseling to increase likelihood of success. In addition, courses are offered at different time frames and at the Riverside and Northridge campuses. Further, the department offers many full scholarships for students who apply; students are constantly reminded and encouraged to apply for these scholarships which are based on funds provided by local high technology employers such as AMD, Applied Materials, Freescale Semiconductor, and many others. The scholarships are available to students who declare a major in any of the six specialty areas. Further, students are also assisted in acquiring internships for those who need to make more money and/or desire experience; in two of the specialty areas, an internship is required (not optional).

In what ways does the program achieve enrollments reflecting the diverse and traditionally underserved populations in numbers that mirror the local populations of our Service Area?

The department's ethnic breakdown is more representative of the regional populations that we serve when compared to the college at large, but much improvement still necessary. The same goes for a more balanced breakdown for gender. The department has been actively recruiting at high schools that are predominantly minority such as Johnston and Travis high schools. Large effort has been made to recruit Hispanics, African Americans, and women into our specialty areas. For Spring 2005, White students accounted for 49%, Hispanics for 24.7%, Asian 13.6%, African American 8.3%, and Women

17.5%. Marketing and recruiting goals for 2006 are going to be more aggressive as they include many more outreach events.

In what ways does the program promote achievement of students' educational goals, student retention, and program completion?

The department encourages and demands that most second year courses require one major project and that it be completed in teams of students. The major project typically involves skill sets typically utilized in industry. A large emphasis is on hands-on learning on labs and projects that reflect up-to-date industry applications. Students are encouraged to at least complete the one-year Certificate in a particular specialty area, then progress into the Associates. To assist students with financial need, we repeatedly urge them and provide them with scholarship applications to fill out. We also offer internships to students interested in getting additional experience and money. Many students go to work during their second year of studies; most large employers share the policy of paying for all tuition expenses once employed. We then accommodate working schedules. We also offer one-to-one specialized tutoring Monday through Thursdays in the mornings, afternoons, and evenings at both Riverside and Northridge (schedules slightly change semester to semester) to insure that all students receive specialized help when they need it. The department hires its own students as tutors to further help students who have done well and are in financial need. We also encourage students to apply for financial aid through our financial aid office. We have our own student advisor that also assists and provides guidance in these matters. In addition, we invite other organizations such as Capital Idea to present to our students who are in more financial need. Not only is it encouraged to complete an AAS in a particular area, but students are also encouraged to go for additional ones, especially in areas that are related and therefore serve as additional advanced and specialized coursework. For example, the students who were employed in the summer of 2005, were acquiring degrees in both Semiconductor Manufacturing Technology and in the newly started specialty Automation, Robotics, and Controls Technology. In 2006, more surveys will be implemented and the data acquired will be used to better serve student needs and increase their chances of graduating and meeting their needs.

In what ways does the program achieve student performance that meets or exceeds state and national benchmarks in transfer to universities, job placement into family-wage careers, retention and completions, basic skills acquisition, literacy level increases, and successful transition from developmental to college-level courses?

In 2002, the Semiconductor Manufacturing program sent a team of students to Albuquerque, New Mexico to compete in a national competition (ATESM Student Team Project Competition) to see which semiconductor team had designed/created the best project. ACC's students received first place, but it was evident that there was a very large gap between first and

second place. As for placement into family-wage careers, in the Fall 1999, graduates got paid between \$40,000 to \$62,000 per year, which was more than two and one half times the minimum wage. In 2001, workers who lost their jobs in the semiconductor industry took home an average weekly paycheck of more than \$1,400, which was 76 percent higher than the average paycheck of \$796 for all Austin Workers (Austin American Statesman, (August 18, 2002). These figures did not account for other types of additional compensation such as stock options which can be significant in high tech fields. This same article also stated that every tech job added disproportionately to the regions wealth. They claimed that it is how Austin went from the 40<sup>th</sup> most wealthy of America's 50 biggest metropolitan areas to the 15<sup>th</sup> wealthiest in 2000. These statistics are important because they show what our students were experiencing at the time. In the second part of 2005, the high tech industry had risen back significantly and companies have been inquiring about graduates constantly. Companies such as Samsung, Applied Materials, Freescale, Toyota, Austin Energy, LCRA have been hiring for more than one year and plan to continue. This situation has allowed the department to provide students with more internships which in turn encourages students to continue their studies and graduate. Most of these companies emphasize the two-year degree for advancement into any technician-level position and pay. As for graduation rates, the following data is provided:

Electronics	Fall 2000	Fall 2001	Fall 2002	Fall 2003	Fall 2004
Student Head Count	663	569	436	323	229
Associate Awardees	67	49	57	58	37
Percent Graduate	10.1%	8.6%	13.1%	18.0%	16.2%

'Student Head Count' is course enrollment for the specified semester and is duplicative. 'Associate Awardees' are students who graduated with an Associate of Applied Science in one of the Electronics areas for that academic year.

In what ways does the program improve personal lives by advancing students toward further education or contributing to their ability to succeed in the workplace and be productive citizens?

Most of the specialty courses contain curriculum developed in conjunction with industry. The courses also require many labs and projects. Further, the department assists many students with internships and some job placement before and after graduation (job placement via internships is a relatively new objective for the new department). Through articulations with Texas State University, we highly encourage students to continue for their four-year degrees, even if they are working. Due to the curriculum having been updated and finalized last month (December 2005), the department still needs

to update its articulation agreements with institutions such as Texas State University.

In what ways does the program demonstrate efficient administration and services that avoid procedures that waste the money or time of students? The department offers a student advisor, Vidal Almanza, who meets with almost all of the students and guides and assists them with paperwork, registration, and some job placement. Further, the specialty areas all share a common core curriculum which allows some students to acquire two related AAS degrees by taking as very few additional courses.

In what ways does the program contribute to creating an institution that is a good place to learn, work, and experience the higher education process? The department is composed of friendly teachers and small classes that allow for extensive instructor-student interaction. Further, the facility counts on many industry tools, machines, and devices that allow students to work on equipment that very well mirrors industry. However, since the department is heavily targeting high school students in 2006, special events will be held to cater to students and parents for this age group. Other specialized events will be held for other market segments such as for students coming from the military.

Does the program assess and review its effectiveness each year and report its findings in the Unit Level Effectiveness Assessment Database (ULEAD)? The department is relatively new in that it merged various areas together from different campuses. The department has not reported to ULEAD but it has undergone significant change via the many meetings with industry in 2005. The department changed, the curriculum structure changed, the curriculum itself changed, the content within courses changed, new specialty areas were added, more internships for students were acquired, and faculty and staff requirements were updated. The department will initiate surveys and assessments in 2006, now that the department has been merged and recreated. Data acquired will be used to guide the department to improved outcomes.

**[b] Responsiveness to community needs and satisfaction of community demand**

In what ways does the program address a verifiable need for the student, community, and society?

From mid 2005 to the present (January 2006), companies have been calling the department for graduates on a weekly basis. This situation did not exist from late 2000 through most of 2004. Organizations such as the Texas Workforce Commission and the Austin Chamber of Commerce have also asked the department for special training arrangements or tours/presentations to existing and prospective employers to the region. There are also strong chances that a large employer in Austin, Samsung, may announce a second plant in 2006. It would be the largest single monetary investment in the history of Texas. There

are other companies looking at the area and at its technical education delivery infrastructure. Various estimates show that employees working in the high technology sector of Austin, for example, make more than twice the average Austin wage. Also various economists have suggested that the future of Austin hinges closely on its ability to retain and attract more high technology firms into the area and that one critical factor is the quality of the educational infrastructure available.

Describe the results of the program's most recent assessment of community need.

The industry advisory board for the department has said that the department needs to market itself and its specialty areas to increase the student count. They report that this self-promotion is critical in order to attract enough students to help meet their own workforce needs. Companies such as Austin Energy, LCRA, Georgetown Utilities, National Instruments, Applied Materials, Samsung, Freescale, Dell, and Toyota have been consistently asking and hiring the graduates. For example, in the summer of 2005, seven students in the Automation, Robotics, and Controls program graduated and were hired. Two went to work for Samsung, one to IBM, one to National Instruments, one to Brandt and Hill, one to UT Austin's JJ Pickle Research Center, and one transferred into a four-year Technology Bachelors degree program at Texas A&M Kingsville. Samsung wanted more graduates of that caliber, but we did not have more student graduates. Another recent development is the creation of the Power Technology specialty area which was created in partnership with power companies because they stated that they have an enormous need for employees for the next ten years as many of their 'baby boomer' employees retire. The high tech drop of 2000 through 2004 proved to be very harsh on our student enrollment; enrollment pickup is gradually taking place. The industry advisory members also agreed that a common set of courses required by all the department's students would be a good idea because it would provide students with a strong electronics-oriented backbone and increase the probability that such courses would be continuously offered. Industry did not want a system where courses would not make and student graduates would not be available; that would be detrimental to them and to the whole region.

How do the program's five-year enrollment trends compare with those of the College overall?

Electronics	Fall 2000	Fall 2001	Fall 2002	Fall 2003	Fall 2004
Course Enrollments	663	569	436	323	229
ACC Total Headcount	25,856	27,577	29,156	28,862	29,004

Source: ACC 2004-2005 Fact Book, page 41

Inversely proportional from 2000-2004, reflecting the largest downturn the high technology sector had ever experienced. As the data shows, Electronics enrollments fell and ACC's enrollments increased. This happened because as

high technology companies laid off personnel, people went back to college for other training, while enrollments in program areas where the layoffs were happening were much less desirable, and therefore suffered. However, as the economy and the high technology sector in the region are undergoing a comeback, enrollments are beginning to improve. Student information inquiries about the specialty areas are significantly higher than two years ago, and likewise, companies are now calling for graduates continuously.

**[c] Accessibility to students and identification of unnecessary barriers**

Analyze when and where courses are offered (by campus, time of day, mode of delivery).

A key requirement to accessibility is knowledge that such programs exist. Currently, the department and its specialty offerings are not known by a large part of the general public. A general survey of any sort will confirm this. High school students are not aware of the specialties, what they are, what types of jobs they lead to, that they are transferrable to four-year university technology degrees, and what salary ranges they pay. Likewise, high school counselors, teachers, and administrators are not aware of our programs. The same goes for employees of many high technology regional companies and the general public. It is agreed that most people in the region are aware that ACC exists, but they are for the most part, unaware that these specialties exist or even that the department exists. However, most are aware that schools such as ITT and DeVry offer specialized electronics training because of the constant television, radio, and print media blitz-style advertising that they do. They perceive schools such as ITT as providing electronics training that leads to a good job, but have no idea that ACC offers SACS-Accredited one-year and two-year AAS degrees that lead to good jobs and offer an education/training that can well be argued, of much higher quality. ACC was involved in intensive marketing in the mid to late 90's, when the semiconductor industry saw no end to its rise, but then it stopped its marketing campaign when the industry fell. However, the industry is back and few students are available to take advantage of the many opportunities. It is critical that ACC implement a comprehensive marketing strategy very soon for the well-being of the department, for many of the disadvantaged or simply unaware citizens of the region, and also for the well-being of the high tech industry of the region. Many of the competitors of ACC, offering similar Electronics degrees, charge significantly higher. For example, one well-known local competitor charges about \$36,000 for the two-year degree, and it is not even SACS-Accredited. That is more expensive than a Bachelors degree worth of tuition, fees, and books at a SACS-accredited university. If one looks at accessibility and the desire to attract a more diversified student body, one can not ignore cost and the huge barrier that it presents to many. However, if one does not know of the alternatives available, it all does not matter. In the year 2006, marketing the Electronics and Applied Technologies will be emphasized. Discipline-specific courses are currently offered at the Northridge campus in North Austin and the Riverside Campus in South Austin. With the recent

consolidation of the Electronics and Semiconductor Manufacturing departments into a single Electronics and Applied Technologies department as of Fall 2004, coupled with the loss of actual dedicated classroom space at the Northridge location, the majority of course offerings are now being held at the Riverside Campus. Prior to Spring 2005, the number of courses taught at each location was roughly evenly split, however certain program-specific courses were limited to the corresponding department location while first-year courses such as DC Circuits, AC Circuits and Digital Fundamentals common to both locations' degree programs were and continue to be taught at both locations. Courses are offered in the morning (9:00am-11:50am), afternoon (12:30pm-3:10pm), late afternoon (4:15pm-6:55pm) and evening (7:05pm-9:45pm) on alternating days, e.g., Monday-Wednesday or Tuesday-Thursday, to accommodate the schedules of our students. At this time no distance learning courses are offered nor weekend offerings. This may change. For example, as enrollments pick up and working students request weekend classes. As for distance learning courses, introductory courses may be targeted for this format. However advanced courses that are hands-on intensive are not appropriate for distance learning at this time.

List the number of sections taught (by location).

For the Fall 2005 semester, 7 sections were offered at the Northridge campus, 30 sections were offered at our Riverside campus location, and one internship (off-site) was offered. Of the 38 sections total, 10 sections were canceled--4 at Northridge and 6 at Riverside. This breakdown will most likely change as courses that are not large-equipment intensive are also offered at Northridge. Again, surveys focused on the new department and the needs of the students will yield better guidance as to sections taught, location, and time. The department has opted to perform one student survey every semester, starting this semester Spring 2006.

List the number of sections closed or canceled per course.

CETT 1405 AC Circuits	2 sections
CETT 1421 Electronic Fabrication	1 section
CETT 1425 Digital Fundamentals	1 section
CETT 1429 Solid State Devices	1 section
CETT 1457 Linear Integrated Ckts	1 section
SMFT 1473 Semiconductor Mfg Tech I	1 section
INTC 2433 Instrumentation & Installation	1 section
CETT 2471 Pulse Circuits & Waveshaping	1 section
SMFT 2473 Semiconductor Mfg Tech II	1 section

How does each of the five-year demographic trends (gender, ethnicity, age group) for this program compare to the overall college trend? (List the source of your information.)

The college numbers for Fall 2004 are as follows:

White	Hispanic	Black	Asian/Pacific	American Indian/Alaskan	Male	Female
60.5%	7.1%	7.1%	5.1%	.8%	43.7%	56.3%

The department's numbers for Fall 2004 are as follows:

Identify any unnecessary barriers to students, especially those who are educationally disadvantaged and not well served by other colleges.

Awareness. Awareness of the department and the many specialty areas that they can pursue, the internships available, the scholarships available, and the relatively high-paying careers that these specialties can lead. Likewise, that in addition to the the financial aid opportunities provided by the college's Financial Aid office, the department also offers many additional scholarships provided by industry endowments, specialized tutoring throughout the week, and that every campus has an office to provide them with additional special needs assistance. Again, marketing is the key essential still missing. Aside from marketing, the college and the department should have a child care facility at every campus. Without a child care facility, we are bypassing many of the very students that we claim we want to help (i.e. at-risk students with children). The State of Texas has many programs and grants for this purpose. ACC should partner with these entities to install flexible, functional, and truly available day care facilities at every one of its campuses. ACC has a day care facility at the Eastview Campus for example, but students claim that there are no openings and only children of people who work there tend to get admitted; that is not at all functional and available.

#### **[d] Student outcomes including participation and successful-completion rates**

How do course completion rates (A-B-C-D rates) for courses within this program compare to College norms?

What are the program completion or graduation rates (compared to intent as well as overall) for this program?

The department has done relatively well in graduating students with both an Associate of Applied Science Degree in Electronics and in acquiring a Certificate. According to the ACC 2004-2005 Factbook, Electronics (which included Semiconductor Manufacturing) awarded 268 Associate of Applied Science degrees and 147 Certificates from 1999 to 2004. The ACC 2000-2004 Factbook listed 42 different workforce Associate of Applied Science degrees. Of the 42 different workforce AAS degrees awarded, only Nursing awarded more AAS degrees than Electronics for the time period between 1999 and 2004. Data from the Office of Institutional Effectiveness states that students who were employed after graduation in the Fall of 2001 were 9.4%. This data listed 90 different declared majors and of those, Electronics ranked number 71 out of 90 in percent

of having a job upon graduation. These numbers are good considering that in the Fall of 2001, the high tech industry was laying off many people. Further, recent graduates from the now-merged department were hired and in high demand as the high technology sector was hiring heavily. Of the seven students that graduated with an AAS degree in the summer of 2005, six immediately acquired jobs at different large high technology companies and one transferred to Texas A&M Kingsville University to go on for a four year Technology degree.

Electronics	Fall 2000	Fall 2001	Fall 2002	Fall 2003	Fall 2004
Student Head Count	663	569	436	323	229
Associate Awardees	67	49	57	58	37
Percent Graduate	10.1%	8.6%	13.1%	18.0%	16.2%

How do withdrawal rates for courses compare to College norms? ACC's withdrawal rates for the Fall and Spring semesters of 2004 and 2005, respectively were:

21% (Data from the 'Outcomes' tab of this report).

The rates for the same time period for the Electronics Department were:

13.2% (Data from the 'Outcomes' tab of this report).

Out of 220 class enrollees, 29 received a 'W.' Further, of the 16 different courses (some taught in multiple sections) that were taught in that time period 17 or 59% of the grades of 'W' were awarded in two courses, DC and AC Circuits. This means that even though the Electronics department experiences close to half of the percentage of 'W' awarded to students, most of those grades of 'W' were awarded in the first two courses of the specialties. Therefore, the program needs to implement additional retention strategies for these two courses.

List the expected learning outcomes for the program.

The learning outcomes for each of the specialty areas vary but have some common themes. First, they must be able to read, write, communicate, and be able to work in teams. Second, they must be able to analyze, test, and use various instruments to troubleshoot, find, and fix problems on different types of systems within their specialty area. Students should, at minimum, be able to list and explain the basic function(s) and purpose of devices utilized in their specialty area. Further, students should be able to think and make decisions based on their broad electronics core background that is now required. Students may be able to design systems and/or subsystems within their given specialty area, but this not a requirement. In some specialty areas such as Automation, Robotics, and Controls Technology and Power Technology, students are expected to complete at least one internship and therefore have specific industry experience before they graduate. This requirement is not currently required of all six specialty areas.

What do the results of the program's student learning outcomes assessments (departmental final exams, exit tests, standardized tests, etc.) indicate about the program?

The department does not administer departmental final exams because of faculty disagreement over their purpose and effect. The department, however, has been discussing their use. However, through feedback from industry and students many changes were implemented in 2005 to address various concerns. For example, it was found that in the Microprocessors class, students who had taken a software class prior to the Microprocessors class did better than students who did not, not surprising considering that though the class covers hardware there is heavy emphasis on the software side. Therefore, with guidance and support from industry representatives, the Fundamentals of Programming class is now part of the core and is a prerequisite to Microprocessors. Another example is that many companies require technicians to read and utilize sophisticated system-level schematics to troubleshoot and fix systems. However, the department only required Semiconductor Manufacturing Technology and Robotics, Automation, and Controls Technology students to take our Electromechanical Devices course which covers these topics. As a result of this student and industry concern, Electromechanical Devices is now part of the core, so that every student entering any of the six specialty areas is required to complete the course for a degree. Another student outcome/concern that caused the department to make changes was that some Capital Idea students were complaining that not enough tutoring was available throughout the week for specialized course tutoring. Each campus has a tutoring center, but the tutors available could not assist in specialized areas such Electronics, Data Acquisition, Microprocessors, Networking, Semiconductor material, Robotic materials, etc... As a result, the department accessed special funds from an industry grant donation coupled with departmental funds to offer more tutors at greater availability throughout the week, at both the Riverside and Northridge campus.

### **[e] Measures of program quality and educational value added**

- **Academic Standards**

What are the processes and procedures that the department uses to maintain academic standards and achieve consistency within the department?

The program has meetings. Currently, the program is finalizing the content of two new courses created as a result of the new core accepted in December 2005. The courses are a combined DC/AC circuits course and an additional Electronics Lab course whose focus will be a summary of the usage of electronic instrumentation for measuring, analyzing, and troubleshooting electronic circuits. The department has agreed to have one meeting every month to provide updates as to what everybody is doing and to make sure that everybody is aware and in agreement of what is being taught and how. Likewise, the department is committed to having one or two meetings a year with its industry advisory council. In 2005, it had 13 official meetings and probably more than 30 unofficial

ones. The year 2006 will witness fewer industry meetings than in 2005, but a significant number will still occur to insure that curriculum follows industry technology change.

- **Curriculum**

What procedures are used to assure that the curriculum is current and adequately meets the needs of students?

As stated earlier, the department meets with industry on a regular basis for this purpose. Additionally, surveys will be done on students and industry partners to find out if changes or improvements are necessary.

Are learning outcomes defined for courses and the program?  Yes  No  
Are course texts up-to-date?.  Yes  No  
Are course and program listings in the ACC Catalog up-to-date?  Yes  No  
Do all courses have up-to-date syllabi on file?  Yes  No

Evaluate the use of instructional resources (including those in the library).  
The library has many general resources on many topics. However, specific information is more likely to be found in specialized journals or in the Internet. Faculty and students routinely use the Internet for information for research papers and course projects.

Evaluate the extent to which technology impacts the mode of instruction, including the number of courses and sections taught via distance learning.  
Currently no classes are taught via distance learning; however, several courses require internships which necessitate student learning off-site in real-world work-based settings. Most of the courses offered within the Electronics and Applied Technologies department require extensive hands-on lab learning, requiring tools and equipment not readily accessible to a student for home-based study. As technology improves, hands-on simulations may become more productive.

Evaluate the extent to which instruction is focused on problem solving, active learning, and work-based elements.  
Many of the advanced second-year specialty courses require multiple labs and at least one major final project. These projects are performed in teams and are extensive. They require students to solve many problems to design systems that work and/or repair equipment. They allow students the opportunity to make many decisions on information that they have, information they find from other sources, and information that they may not have. Therefore, these projects emulate what these students will experience in industry. For example, this last semester (Fall 2005), students in an advanced Robotics class got a servo motors-driven robot to work and correctly move all the pieces of a chess game to opposite sides. This project had hardware, software, and physical challenges. In another advanced troubleshooting course, the students designed, manufactured, and tested a prototype machine that would be used by Dell Corporation to clean

computers of accumulated factory dust prior to packaging for shipment. This project like the others was very intensive and had many technical aspects to it.

List below the current discipline-specific courses within the program and the date of the latest review.

Course CETT 1409 DC-AC Circuits	Date of Last Review 2005
Course CETT 1425 Digital Fundamentals	Date of Last Review 2005
Course CETT 1429 Solid State Devices	Date of Last Review 2005
Course CETT 1445 Microprocessor	Date of Last Review 2005
Course CETT 1457 Linear Integrated Circuits	Date of Last Review 2005
Course CPMT 1445 Computer Systems Maintenance	Date of Last Review 2005
Course CPMT 1449 Computer Networking Technology	Date of Last Review 2005
Course CPMT 2449 Advanced Computer Networking Technology	Date of Last Review 2005
Course EECT 2433 Telephone Systems	Date of Last Review 2005
Course EECT 2439 Communication Circuits	Date of Last Review 2005
Course EECT 2188 Internship—Electrical, Electronic, and Communications Engineering Technology/Technician	Date of Last Review 2005
Course EECT 2288 Internship—Electrical, Electronic, and Communications Engineering Technology/Technician	Date of Last Review 2005
Course EECT 2289 Internship—Electrical, Electronic, and Communications Engineering Technology/Technician	Date of Last Review 2005
Course ELMT 1371 Industrial Safety	Date of Last Review 2005
Course ELMT 2335 Certified Electronics Technician Training	Date of Last Review 2005
Course ELMT 2437 Electronic Troubleshooting, Service, and Repair	Date of Last Review 2005
Course ELMT 2441 Electromechanical Systems	Date of Last Review 2005
Course ELPT 2449 Industrial Automation	Date of Last Review 2005
Course INTC 1207 Electronic Test Equipment	Date of Last Review 2005
Course INTC 2433 Instrumentation and Installation	Date of Last Review 2005
Course ELMT 2472 Elements of Electrical Power Systems	Date of Last Review 2005
Course ELMT 2473 Electrical, Electronic, and Fluid Schematics	Date of Last Review 2005
Course INTC 2471 Data Acquisition and Measurement	Date of Last Review 2005
PTAC 2314 Principles of Quality	Date of Last Review 2005
RBTC 1405 Robotics Fundamentals	Date of Last Review 2005

RBTC 2445 Robot Application, Set-up, and Testing  
Date of Last Review 2005  
SMFT 1473 Semiconductor Manufacturing Technology I  
Date of Last Review 2005  
Course Date of Last Review  
Course Date of Last Review  
Course Date of Last Review  
Course Date of Last Review

- **Faculty**

Do all faculty teaching in the program meet SACS requirements?

Yes  No (if no, please explain)

Follow the directions below to complete the SACS *Roster of Instructional Staff*.

Column One: Provide the name of the faculty member and indicate full or part time status.

Column Two: List, from the *ACC Catalog*, the course prefix, course number, and course title of all credit courses taught. If appropriate for establishing the relationship between the course and the faculty member's qualifications, provide the course description as well. Indicate whether the courses are Transfer (T) or Non-Transfer (N).

Column Three: List each academic degree earned by the faculty member, and indicate the discipline (concentration or major) of each degree; the institution which awarded the degree; and the total number of graduate semester hours earned in each discipline in which courses have been (or will be) taught.

Column Four: Specify qualifications such as diplomas or certificates earned (with field indicated), related work experiences in the field, professional licensure and certifications, honors and awards, continuous documented excellence in teaching, and other demonstrated competencies and achievements (such as publications or papers presented) that contribute to effective teaching and student learning outcomes. Make clear the relationship between these qualifications and the content of the courses assigned to the faculty member.

1) Name	2) Courses Taught	3) Academic Degrees Earned	4) Other Qualifications
Hector Aguiar	Electronics	BSEE	Industry Experience
Ronnie Wilson	Electronics	BSEE	Industry Experience
Linton Brooks	Electronics	BSEE	Industry Experience

What is the ethnic diversity of the faculty?

Within the department, 53.3% of the faculty are White, 33.3% are Hispanic, 6.7% are Black, 6.7% are Asian/Pacific Islander, 0% are American Indian/Alaskan Native, and 0% are Other. This mix represents our current staff of 6 full-time faculty members, 50% (3) of which are Hispanic and 50% (3) of which are White, as well as our pool of 9 adjunct faculty members. Within the adjunct faculty, the mix changes from semester to semester depending on how many classes make and which ones. With regards to gender, all full-time faculty are currently male

and two (13.3%) of the nine adjunct faculty members are female. Much work remains to be made in hiring more women as faculty, especially because we are trying to attract more women into the specialty programs. The student population should mirror the service areas of the college and the faculty ethnic and gender breakdown should be likewise. Much work remains to be done in this area for the department and more so for the entire college.

What evidence is there that faculty are staying current in their respective disciplines and instructional methodologies?

Through professional development courses; however, much more can be done. Because technology is changing at an increasing rate, it may be necessary that faculty perform internships themselves to keep abreast of changes. Taking additional courses or workshops as faculty development may not be sufficient to keep abreast.

What recognition has been given to faculty within the last year?

Professor Ronnie Wilson received the NISOD award in 2005. Professors Alberto Quinonez and Don Holden received it in 2004 and Professor Jesus Casas in 2003.

Describe professional development activities in which program faculty participate. In addition to division meetings, faculty generally participate in technical courses to enhance their expertise and broaden their skills. Several have also participated in seminars which will enhance their teaching skills. For example, in mid 2005, Raj Nagarajan, Laura Marmolejo, Linda Smarzik, Jesus Casas, and Hector Aguilar attended a one-week conference in Nanotechnology in Santa Clara, California. Since then, a major Nanotechnology grant proposal has been submitted. Also, Hector Aguilar attended a Society of Manufacturing Engineers Conference in St. Louis in 2005 that related to the new Automation, Robotics, and Controls Technology program specialty. Professional Development activities are already being scheduled for 2006.

What percent (and the total number) of faculty participate in formal professional development activities on a regular basis?

Seven (46.7%) faculty members (including adjunct) participate in formal professional activities on a regular basis. This number seems low but the reason is that many of the adjunct faculty members work for industry. Many of these adjuncts actually receive more professional development than many of the other faculty members through their respective employers. However, these numbers need to be improved. One thought is to have some of these adjuncts be the presenters for specialized topic training.

Describe the types of discipline-related professional development activities offered.

Rabbit 2000 w/TCP/IP Stack seminar; NI Week conference; MATEC - Work Ready Electronics Workshop; Telephone Systems and Cisco Routers Workshop; Networking Workshop.

What percent of sections do full-time faculty teach?

For the Fall 2005 semester, 67.8% of our course sections were taught by full-time faculty. This represents an ongoing trend for the Fall and Spring semesters with the Summer semester, generally taught predominantly by full-time faculty members.

What percent of contact hours do full-time faculty teach?

As enrollment numbers dropped the last four years, the percentage for full-time faculty increased and the percentage for adjunct faculty decreased, as fewer sections were left over. In the late 1990's, the percentage was about 50 percent full-time and 50 percent adjunct. For the Spring 2006 semester, the breakdown is:

Full-time faculty: 81.5%

Adjunct faculty: 19.5%

Are student evaluations of instruction within acceptable range?  Yes  No

To what extent are alternative modes of instruction incorporated into classes?

- **Student Satisfaction**

Do student course evaluations demonstrate satisfaction with courses?

Yes  No

**[f] Adequacy of program resources and efficiency of resource use**

Describe the overall adequacy of resources (human, technological and capital, facilities, and fiscal) available to the program for providing effective program delivery and outcomes.

Budgeted \$790,204 for FY2006 which represents an adjustment to adjunct faculty salaries budgeted from previous years.

What is the ratio of full-time to adjunct faculty (by course and for the program overall)?

Currently there are 6 full-time faculty in the department and 9 available adjunct faculty. For Fall 2005 28 total sections were taught. Of that total, 32.1% were taught by highly-qualified adjunct faculty, the remainder by our full-time faculty. Adjunct faculty are particularly utilized for specialty courses where their expertise in particular fields is invaluable. Generally our adjunct faculty are working full-time in related industries.

How up-to-date is the equipment used by the program? It varies among specialty areas. For example, in the Automation, Robotics, and Controls Technology specialty advanced software such as DeviceNet and LabView 8.0 are used. Robots with AC servo motors are also used, and modern conveyor systems. In the Computer Electronics/Telecommunications specialty area modern Dell servers are used. In the Semiconductor Manufacturing Technology specialty, the equipment used is a mix between educational and industry grade. The cleanroom has specialized educational equipment, but outside of the cleanroom the students troubleshoot actual systems with components very similar to the newest ones being used. The Power Technology program does not have much equipment yet because it is a new program; equipment acquisition plans are under discussion.

Identify possibilities for improving the efficiency of the program's use of resources.

Faculty need to be utilized for many other functions such as marketing; this plan is being implemented starting January 2006 (the beginning of the implementation of the department's marketing plan). Because of the merger, there are some responsibility and job task changes that are still pending.

**[g] Comparison of program performance, price, and enrollment with that of alternate local suppliers**

How is the program competitive with similar programs offered by other institutions or schools in the service area in terms of performance, cost to students, and enrollments?

Currently annual expenses for attending ACC full-time and seeking a degree within the Electronics and Applied Technologies department are not greater than a fifth the expense of attending any of the local providers of 2-year degrees in some form of electronics training. Local competitors include ITT, Southwest Institute of Technology, Virginia College and DeVry (limited to Computer Technologies) and Capital City Trade & Technical School. Our program has the added benefit of being SACS-accredited, an important value for students that want to continue their studies at 4-year degree programs. Further, the department has much better facilities and equipment than most of its competitors (possibly better equipment overall than all the others).

**[h] Direct and indirect program-related revenues and costs to the College**

Identify the major sources of revenue for the program, including grants, partnerships, etc.

For FY2004, Revenue from State Funding was \$237,574, from Tuition was \$130,154, and \$12,070 from Lab Fees for a total direct revenue of \$379,797.

Compare program costs to those of other ACC programs.

The program costs are relatively high. These costs will decrease when more efficiencies in human resource reallocations are made. The program may be operating with over supply of human resources in some areas. Further, as the high technology continues its recovery, enrollments are expected to increase, which will increase state funding and tuition revenue.

Compare the program's actual expenditures to the approved program budget for the previous two years.

	Budget	Actual Expenditures
FY2005 (combined Electronics/SMT)	\$ 1,079,794	\$ N/A
FY2004 (combined Electronics/SMT)	\$ 1,108,552	\$ 1,156,846*

\*Includes capital overlay expenditure of \$242,502 for Master Tech Plan purchases.

Source: ACC Operating Budget Book FY2004  
 ACC Operating Budget Book FY 2005  
 ACC FY2004 Program Revenues vs. Expenses, Business Services

**TRANSFER or WORKFORCE AREA-SPECIFIC INFORMATION**

**Only Workforce Programs complete the items below.**

Report/status from latest external accrediting agency visit  
 SACS accreditation successful.

When was the most recent program revision?  
 Fall 2005

Number of declared majors intending to complete a program who complete degree/certificate requirements within 6 years  
 [Redacted]

Average number of semesters it takes for students to gain degree/credential. Our program is designed such that a full-time student should be able to gain an Associates of Applied Science degree in Electronics Technology within 5 semesters and/or a Certificate in a specific discipline specialty within 3 semesters. That being said, as of Spring 2005\* 30.6% of our students were enrolled part-time with 69.4% taking only one electronics course within the semester. 68.5% of our students reported working while attending classes averaging over 38 hours per week spent at their job.

\*Source: Internal Student Survey performed Spring Semester 2005, Spring2005\_STUDENTPROFILE Statistical Analysis

Number of graduates within the last three years

FY2005 AAS degrees awarded in Electronics Technology = 27  
FY2005 Certificates awarded in Electronics Technology = 12  
FY2004 AAS degrees awarded in Electronics Technology = 37  
FY2004 Certificates awarded in Electronics Technology = 18  
FY2003 AAS degrees awarded in Electronics Technology = 57  
FY2003 Certificates awarded in Electronics Technology = 30

#### Demographics of graduates

Percent of graduates who are employed within one year of graduation.

In 2001-2004, the department had few graduates because the high technology companies were not hiring. Therefore, placement rates were very low. However, in summer 2005, seven students graduated and six were immediately placed (two at Samsung, one at IBM, one at National Instruments, one at Brandt and Hill, one at UT's JJ Pickle Research Center) and one was not placed because he chose to transfer to a four-year technology program at Texas A&M Kingsville.

What evidence exists that program completers (or near completers) are successful on the job? What, if available, are their beginning salaries?

Samsung company human resource manager said he was extremely pleased with the quality of the 2005 hires (two students) and that he wanted as many of those graduates as possible. Samsung offered a job to a third student but that student declined because he was offered a job at IBM. Brandt and Hill is a manufacturer of automated conveyor systems and they also hired a recent graduate. Within six months, the graduate was promoted to trainer for new automation hires. Dr. Banerji, Director of UT Austin's JJ Pickle Research Facility hired one graduate and reported to be extremely pleased with the knowledge and skills of the employee. Beginning salaries range from \$13 to \$25 per hour. Most of our graduates are starting between \$15 and \$20 per hour.

Percent of employers indicating satisfaction with graduates.

Because department has recently merged, data not available but satisfaction of recent hires is very high as stated for previous question.

Discuss the most recent results of Focus Group or internal survey of employers. Because the Robotics, Automation, and Controls Technology specialty program and Power Technology program are new and the department's recent merger, data is not known. However, surveys should be done in late 2006 and 2007 to know actual employer perceptions and student outcomes.

Number of employers indicating need for more graduates

Fortunately, in late 2005 and early 2006, almost every large company in Central Texas is hiring. Very large companies like Samsung, Freescale, Applied Materials, Austin Energy, Toyota, and National Instruments have much difficulty hiring qualified employees. The department has created a posted job inquiry

board at the Riverside campus, in the Frank Squires building main hallway; the 3x4 posted area is completely covered with job ads available.

Provide evidence of SCANS competency integration into course syllabi and programs.

In many of the courses, a project is due, a report is due, and work needs to be done in teams. In many of these projects students have to be creative, have to do research, make informed choices, and make oral presentations of their results. Further, in some instances, people from industry are invited to attend and provide feedback on the presentations and project results.

How often does the program's advisory committee meet to discuss curriculum issues?

We try to meet at least once or twice a year. 2005 was the exception because the programs were merged and everything was reviewed and much of it was restructured and changed.

When and where are advisory committee minutes maintained and posted?

Minutes are submitted for posting online at <http://accweb.austincc.edu/minutes/smtachpg.htm> within one week of meeting. Actual minutes and members attending are maintained within department office at Riverside Campus.

Evidence of recent review of curriculum by external advisory committee.

Entire curriculum structure changed, new core created, new specialties created, and course content revised. Visit <http://accweb.austincc.edu/minutes/smtachpg.htm> for greater detail.

Advisory committee validation of entry level skills

The industry advisory council met a number of times in 2005 to discuss the core and the courses in the different specialty areas. They discussed the basic skill sets that all electronic students should have and that is how they agreed on the core.

**Only Transfer Programs complete the items below.**

Number and percent of graduates who transfer within one year of graduation.

█

Number of articulation agreements with universities and colleges

█

Number of courses that transfer

█

Number of student complaints about problems with course transfer

█

Discuss the results of the most recent Survey/focus group of transfer institutions.

█

Discuss data from transfer institutions if available.

█

Number of students transferring successfully.

█

## CONCLUSIONS

Based on the information collected and analyzed during the program review process, what are the major conclusions of this review of the program? Summarize them here and complete the *Program Status* form.

The department was recently merged, the curriculum was reviewed by industry representatives from different industries and they agreed that a common core of electronics coursework should be required of all students, then agreed upon the actual makeup of the core. Industry advisors then agreed on the specialty courses required, the name of the department and each of the specialties. Now that the department has merged and the curriculum has undergone a very significant updating, the department needs to market the specialties, jobs available, internships, scholarships, and other student benefits. The department will focus on high schools, other ACC students who may not yet have a major, and the general community. Second, the department needs to institute a more rigorous survey program that is completed for every semester so that continuous adjustments are made based on analysis of data extracted from surveys. Third, the department needs to continue its challenge of bringing all faculty and staff to share and work together more effectively. Monthly meetings to discuss each others projects and updates on departmental initiatives will help bring people together. The department needs to learn how to celebrate successes, especially student successes.

## PROGRAM VISION STATEMENT

State the program's vision or preferred future for the next five years. The vision statement should provide direction to the program as it makes improvements to enhance its effectiveness and efficiency.

The department needs to be known as not only the lowest cost provider of high technology training in the region, but as the provider of choice for employers and students. This is a difficult task considering that many in the community do not even know that ACC has technology programs. The department needs to market its current specialty areas to high school students, teachers, and counselors; to other ACC students at all the other campuses, and to people from the community. These challenges are the greatest opportunity for the department because the specialty area graduates are in high demand, the program has relatively very good facilities, equipment, and faculty; the degrees are SACS-accredited so that students can transfer to schools such as Texas State University, St. Edwards University, and others; and the cost is just unbeatable. The department in conjunction with industry partners has created new specialty areas recently that are also electronics-based. The department needs to make sure that it meets student needs first. It also needs to continue its strong relationship with industry to insure that it gets real support from industry such as internships, jobs for graduates, equipment donations, scholarship donations, and ongoing cooperation and guidance on curriculum issues. The department also needs to make sure that its faculty, staff, and student body represent the ethnic

diversity and gender mix of the community that it serves. Many citizens in the lower economic rungs are bypassed for many reasons. ACC and this department should reduce these gaps by doing effective marketing, outreach, and working on functional student retention strategies, once these students arrive.

## RECOMMENDATIONS

What does the self-study team recommend for improving or maintaining the quality of the program? Summarize the recommendations here and complete the *Quality Improvement Plan* form.

- 1) Need to implement a high school marketing plan
- 2) Need to implement an internal ACC marketing plan
- 3) Need to implement a community marketing plan that targets the community in general, and potential students that are already working
- 4) Need to further bring faculty and staff together to a common mission and vision by having monthly meetings where people share with others their projects and activities. These meetings are also held to address concerns and implement ideas for improving the student and employee condition.
- 5) Need to create and implement continuous surveys for students, employers, and others so that decisions are based on data that reflect the new department and curriculum.
- 6) Need to continue to maintain and expand its relationships with its many industry partners
- 7) Need to critically analyze and evaluate opportunities as they arise.

## ADDITIONAL COMMENTS



## APPENDIX

List all documents that you used in your report:

ACC Fact Book 2004-05  
Accessibility Table 1  
Accessibility Table 1A Detail  
Accessibility Table 1B Detail  
Accessibility Table 3  
College-wide Grade Distribution Report  
ELEC Department Grade Distribution Report  
ACC Catalog Degree Plan for Electronics  
Spring 2005 Student Profile: Internal Survey  
IPEDS College Opportunities Online  
FY2005 Revenues vs. Expenses  
ACC FY2005 Budget Manual  
ACC FY2004 Budget Manual

ACC FY2006 Budget Manual  
Spring 2006 Faculty by Teaching Status, Ethnicity and Gender  
Texas Employment Projections 2002-2012  
Electronics Graduates 202F-205F

When you have completed this report, send it via e-mail to the Manager of Quality Initiatives ([njokovic@austincc.edu](mailto:njokovic@austincc.edu)) as an attachment.

## Quality Improvement Plan for Electronics and Applied Technologies Program

Date Completed: 1/15/2006

Field	What to include
<b>Recommendation #</b>	Assign a number to this recommendation for tracking purposes.
<b>Recommendation:</b>	Taken from the <i>IPRS</i>
<b>Planned Implementation date:</b>	When does the program expect to begin to implement this recommendation?
<b>Estimated Completion date:</b>	When does the program estimate this recommendation to be fully implemented?
<b>Action/Task</b>	What steps must the program do to implement the recommendation?
<b>Measure of Success/ Desired Outcome</b>	If the recommendation is implemented, what about the program will be improved? What difference will the implementation of this recommendation make in relation to students, the program's purpose, the College's mission? How will this recommendation improve learning and help meet targeted objectives?
<b>Estimated Cost(s)</b>	This field is particularly important because the information the program enters here is the information that the Instruction/credit Cluster Group will consider in its Master Plan process. Consider changes that require one-time costs (equipment, renovation, etc.) and changes that require recurring costs (typically new positions).
<b>Consequence if not funded</b>	If this recommendation is not funded, how will students, the program, the College, or the community be negatively impacted?

<b>Recommendation #</b>	1
<b>Recommendation:</b>	To market to high school students
<b>Planned Implementation date:</b>	January to December 2006,
<b>Estimated Completion date:</b>	First round by May, on-going thereafter
<b>Action/Task</b>	Visit 32 high schools in region
<b>Measure of Success/ Desired Outcome</b>	Present to students, counselors, and teachers at 32 high schools by May (before high school graduation); to enroll one student minimum from each of the 32 high schools.
<b>Estimated Cost(s)</b>	\$3,000 (materials and presenters' mileage)
<b>Consequence if not funded</b>	High school students will continue to be unaware of program offerings
<b>Who is responsible?</b>	Dept. chair and all full-time faculty

<b>Recommendation #</b>	2
<b>Recommendation:</b>	To market to other ACC students at all other campuses
<b>Planned Implementation date:</b>	January to July, 2006
<b>Estimated Completion date:</b>	Flyers installed by end of February, counselors presented to by July 2006

<b>Action/Task</b>	Create effective flyers and post them throughout all campuses and present to counselors at all campuses
<b>Measure of Success/ Desired Outcome</b>	1) flyers created and posted at all campuses at strategic locations, 2) all counselors fully aware of specialty areas, 3) 20 students from other campuses who did not have a major, enroll in electronics courses by Fall semester 2006.
<b>Estimated Cost(s)</b>	\$1,000 for flyers and faculty/staff mileage expenses
<b>Consequence if not funded</b>	Missed opportunity for department; students at other campuses not aware of opportunities; counselors not as aware about specialty updates and opportunities
<b>Who is responsible?</b>	Alberto Quinonez (faculty member), Vidal Amanza (student advisor), and Laura Ottmers (staff member)

<b>Recommendation #</b>	3
<b>Recommendation:</b>	Market to community
<b>Planned Implementation date:</b>	February to December 2006
<b>Estimated Completion date:</b>	Website by end of April,
<b>Action/Task</b>	Fill-in website template with updated department information
<b>Measure of Success/ Desired Outcome</b>	Website installed by end of February and updates uploaded by end of April
<b>Estimated Cost(s)</b>	N/A
<b>Consequence if not funded</b>	N/A
<b>Who is responsible?</b>	Laura Ottmers, Audrie Osio, Charles Lombardi, and Tom Cloud (all staff members).

<b>Recommendation #</b>	4
<b>Recommendation:</b>	Market to community
<b>Planned Implementation date:</b>	March, April, August, and November
<b>Estimated Completion date:</b>	N/A
<b>Action/Task</b>	Implement radio advertising and open houses for department
<b>Measure of Success/ Desired Outcome</b>	Increase departmental enrollment from the general public by 30 students by Fall 2006; increase overall awareness of ACC as a major supplier of high technology training for the region
<b>Estimated Cost(s)</b>	\$20,000
<b>Consequence if not funded</b>	Difficult to inform general public of opportunities in high technology at ACC such as competitors do (i.e. ITT, DeVry, Southwest School of Electronics, Virginia College,...)
<b>Who is responsible?</b>	Lead: Tom Cloud; help from Hector Aguilar, Linda Smarzik, full-time faculty and staff

<b>Recommendation #</b>	5
<b>Recommendation:</b>	Have monthly dept. meetings to share with others what we do, what we are working on, status on department initiatives, and to keep the program united
<b>Planned Implementation date:</b>	One meeting per month
<b>Estimated Completion date:</b>	N/A
<b>Action/Task</b>	Hold the meetings and perform agreed upon actions
<b>Measure of Success/ Desired Outcome</b>	Successfully hold the meetings with greater than 90% participation of all full-time faculty and staff (adjunct faculty encouraged to attend but not required)
<b>Estimated Cost(s)</b>	N/A
<b>Consequence if not funded</b>	N/A
<b>Who is responsible?</b>	Hector Aguilar (department chair) and Alberto Quinonez (assistant department chair)

<b>Recommendation #</b>	6
<b>Recommendation:</b>	To solicit survey data from students and employers so as to make decisions based on data for the new department and its new specialty areas by creating updated surveys, administering the surveys, compiling the data, sorting it and analyzing the results.
<b>Planned Implementation date:</b>	April 2006, July 2006, and November 2006
<b>Estimated Completion date:</b>	N/A
<b>Action/Task</b>	Create, deliver surveys, compile, sort and save data. then continuously act on data
<b>Measure of Success/ Desired Outcome</b>	Three or more surveys implemented by end of 2006
<b>Estimated Cost(s)</b>	\$1000 (paper, postage, and some mileage)
<b>Consequence if not funded</b>	must be done
<b>Who is responsible?</b>	Lead: Laura Ottmers (staff member), help from Linton Brooks, Jesus Casas, and all other full-time faculty and staff

<b>Recommendation #</b>	7
<b>Recommendation:</b>	Continue meeting with industry advisory group to further solidify partnerships to develop stronger curriculum, acquire more internships, help with marketing, and take advantage of opportunities that are realistic
<b>Planned Implementation date:</b>	Biennially, once in June and once in November
<b>Estimated Completion date:</b>	Ongoing
<b>Action/Task</b>	Plan and hold industry advisory meetings
<b>Measure of Success/ Desired Outcome</b>	Meetings held and industry guidance and

	participation in areas such as marketing, internships, and equipment and scholarship donations
<b>Estimated Cost(s)</b>	N/A
<b>Consequence if not funded</b>	N/A
<b>Who is responsible?</b>	Hector Aguilar (department chair) and Alberto Quinonez (assistant department chair)