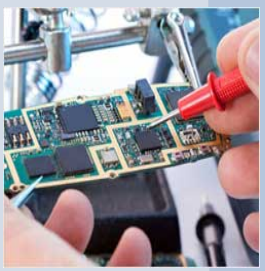
El Camino Community College

Electronics and Computer Hardware Technology Department

Program Review 2011-2015



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ECHT ACADEMIC PROGRAM REVIEW2011-2015

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1. Overview of the Program

El Camino College's Electronic and Computer Hardware Technology Program, ECHT, is the only remaining, traditional legacy, regional community college general electronics program in existence west of the 57 Freeway.

***ECC's Electronics Department Strengths*:**

- The, El Camino's Electronic Program has reputation that it prepares students for both the needs of local industry, in regards to electronic training, in entry level jobs, as well in advanced skill upgrades.

- The ECHT department offers sixteen general and specialized electronics courses. Many of these courses are offered every semester.

- Offers students option s: transfer, skill upgrade, career exploratory.

- Our students can transfer to local CSU's Industrial or Engineering Technology programs, as well pursue either an Associates or Certificates in the program with academic "rigor" and affordable cost (CSULB, CSULA, Cal Poly Pomona, Arizona State University, and the Oregon Institute of Technology)

- We provide critical job training to our local and regional partners that are now requiring their employees to pursue either a certificate, or eventually an Associate's Degree, as a condition of employment

- Two areas of study emphasize either general electronics technology or digital systems technology, which could lead to a program or "stackable" certificates and or an Associate Degrees.

- Most students will be able to complete various certificates and a possible AS degree within a three year period. There're two distinct pathways of study for our students.

- Other local colleges have closed or discontinued their electronics related programs, the ECHT service area has expanded to include areas previously served by Santa Monica College, Long Beach City College, and Harbor College. Capacity issues will need to be considered to meet the larger service area.

- The ECHT Program provides both day and night programs to meet the needs of full-time, part-time, and returning students.

- One very strong aspect of this program is that it promotes critical thinking and problem solving. Students are taught systematic approaches to diagnose, troubleshoot, repair, and maintain all manner of electronic systems, components, and various classifications of electronic assemblies.

- Students acquire proficiencies in: assembling analyzing, Testing, and troubleshooting, both analog and digital systems

- Many students return to update their skills, knowledge, and training in use of modern electronic test equipment, as well, fostering cognitive, circuit analysis skills, to meet the requirements of changing technologies.

- Many students complete the program successfully and acquire certificates of completion and associate degrees.

a) Report data, analysis, and conclusions using protocols, paper/paperless used throughout the industry

By providing students a critical thinking process, ECHT Program has produced successful professional technicians. Our graduates work for regional aerospace firms, consumer electronics service and repair facilities. Many have found in city organizations and municipal repair facilities. Cities that employ our graduates include: Gardena, Hawthorne, Lawndale, Long Beach, Los Angeles, Redondo Beach, Santa Monica; Torrance; municipal employers include: Metropolitan Transit Authority and Los Angeles County. Many of these have further advanced to become experienced team leaders and managers. A few of our students have graduate degrees, MA/MS, even PHD's, have enrolled in our courses to acquire skills to make them more productive as engineers, and in some cases senior scientists.

The Bureau of Labor Statistics states, the median annual wage earned by an electronic technician in May of 2014 was $36,710 per year. The job outlook projects an average growth rate of 5-7% from 2010 through 2020, which generally is as fast as other technical occupations. Opportunities for qualified technicians should be very good.

Percentile	10%	25%	(Median) 50%	75%	90%
Hourly	$10.06	$13.10	$17.65	$23.49	$29.43
Annual Wages	$20,920	$27,250	$36,710	$48,860	$61,210

b) Describe the degrees and/or certificates offered by the program. The Electronics and Computer Hardware Technology Program offers two AS Degree options and three Certificates of Achievement, and five Certificates of Accomplishment

AS Degrees

An AS Degree or Certificate of Achievement will be granted upon completion of all program requirements. At least 50% of the courses for the Certificate of Achievement must be completed at El Camino College.

Computer Technology Option:

Electronics and Computer Hardware Technology 11, 22,110, 130, 140, 142, 144; two courses from: Electronics and Computer Hardware Technology 95abcd*, 191, Computer Information System 13, 40

(* one semester)

Total Units: 29-31

Electronics Technology Option:

Electronics and Computer Hardware Technology 11, 22,110, 120, 122, 124, 130, 140;one course from: Electronics and Computer Hardware Technology 95abcd*, 142, 144, 191 (* one semester)

Total Units: 27-29

Certificates of Achievement

Computer Hardware Electronics Technician:

Electronics and Computer Hardware Technology 11, 22, 110, 130, 140, 142, 144;two courses from: Electronics and Computer Hardware Technology 95abcd*, 191, Computer Information Systems13, 40 (*one semester)

Total Units: 29-31

Computer Hardware Electronics Technician:

Electronics and Computer Hardware Technology 11, 22, 110, 130, 140, 142, 144;two courses from: Electronics and Computer Hardware Technology 95abcd*, 191, Computer Information Systems13, 40 (*one semester)

Total Units: 29-31

Certificate of Accomplishment

CompTIA Computer Hardware Technician:

Electronics and Computer Hardware Technology 144, 146, 148

Total Units: 12

Computer Hardware Technician:

Electronics and Computer Hardware Technology 11, 140,142, 144

Total Units: 15

Electronics Technician:

Electronics and Computer Hardware Technology 11, 22,110, 120, 140

Total Units: 16

c) Explain how the program fulfills the college's mission and aligns with the strategic initiatives. (see Appendix A)

The following table shows how the ECHT program is aligned with the mission statement and fulfills El Camino College Strategic Initiatives.	
El Camino College Strategic Initiatives	Electronics and Computer Hardware Technology
SI A: Enhance teaching to support student learning using a variety of instructional methods and services.	The new ITEC Complex was put into service in Spring of 2015. Substantial planning and investment is being made to improve existing classrooms, laboratories, and facilities of the ITEC Complex. Two full-time instructors have had an opportunity to provide input design of their offices, classrooms, and laboratories. The classrooms and laboratories incorporate the latest technologies. One outstanding part-time instructors have been hired to enhance the program
SI B: Strengthen quality educational and support services to promote student success.	Local Industry Representatives participate in the Industry Advisory Committee meetings. Recommendations are evaluated and deployed to improve student success in terms of program completions and in employment prospects. Tool room staffing and support has been improved to provide students a cost effective laboratory experience. Safety procedures have been enhanced and enforced similarly across all shop laboratories to promote a consistent learning experience
SI C: Foster a positive learning environment and sense of community and cooperation through an effective process of collaboration and collegial consultation	Students in ECHT classes work in teams, which teaches them collaboration, team work, and cooperation. ECHT collaborated with the Environmental Technology to provide curricular support in developing an Energy Renewable component to enhance the ENV Tech Curriculum
SI D: Develop and enhance partnerships with schools, colleges, universities, businesses, and community-based organizations to respond to the workforce training and economic development needs of the community	ECHT sent one faculty member to Northrop Grumman, Redondo Beach, and summer 2104, to learn "J" Standard electronic fabrication techniques. Plans include providing future "J" Standard training to students enrolled in program as well, supporting local industry. Proximity to Northrop, Boeing, Raytheon, and Aerospace Corp, may lead to opportunities to collaborate with them in the near future. A new ITEC Complex facility and the opportunity to achieve "J" Standard certification will make our program more appealing to electronic and aerospace manufacturers

SI E: Improve processes, programs, and services through the effective use of assessment, program review, planning, and resource allocation.	ECHT faculty members reviewed and added three SLOs for each course in the program. Assessments were completed on courses scheduled for this year. The assessment, program review, planning, resource allocation, and self-reflection are in a state of continuous improvement. Considerations and dialog are ongoing to improve these processes. ECHT Program review, SLO development, and plan builder continue to evolve.
SI F: Support facility and technology improvements to meet the needs of students, employees, and the community.	We moved into the new ITEC Complex in Spring of 2015. This move from the existing the existing Industry and Tech Building, which is over 50 years old, offered us new classrooms, that reflects "State-of-the-art" refinements to students, or supported industries, and the community
SI G: Promote processes and policies that move the College toward sustainable, environmentally sensitive practices	We have incorporated safety and cleanliness throughout the instructional areas. There are hazards associated with materials, electrical shock, injury from both hand and power tools.. We make sure that all hazardous materials are stored and handled in a responsible manner. We are also widening our program to respond to more ecologically responsible forms of solvents that are environmentally friendly. We promote processes and policies that move the College toward sustainable, environmentally sensitive practices/process. The new classroom/labs have been designed with automatic lighting controls in classrooms, labs, and automatic sprinkler systems for limited fire suppression

d) Discuss the status of recommendations from our previous program review.

In addressing ECC overall strategic initiatives which will be individualized in this document the ECHT program looks toward technology and leveraging those skills in the highest demand by the electronics and related industries. The ECHT program has invested heavily in technology to promote student skill development. The department received a substantial grant, $100,000, from Southern California Edison to replace test equipment that supports major portions of our core program. Students are learning to use complex data acquisition tools to analyze power quality, system operation, fault analysis and system analysis. Students in the ECHT program learn how to use technology and acquired fundamentals skills to become a competent electronic professional initiatives F and G.

The development of a relationship with student success and library resources is a leading mandate in the ECHT program. Many courses now require students to complete team learning projects to team presentations and the use of outside the classroom resources to complete student assignments. Students are required in many courses to complete daily logs and evaluate successes on accomplishments. CompTIA certification, A+, Net+, and Security+, training has been added to provide students the opportunity to set them self apart from their competition and enable career success. Students are required to meet increasing standards of excellence through testing, evaluation team success. These program steps are in line with initiative C, A, E, and B.

Instructor development is another key to program success. Over the last year, 2014-15, two of our full time faculty attended the National Consumer Electronics Trade Show, in Las Vegas, and another attended the Hi-Tech National Conference in Dallas, to study new and emerging technologies to improve program value and promote student development and employment. These activities are in line with Initiatives F, D, C, and B.

1. The College's Director of Safety and Health should help the department identify and inventory safety problems in all Electronic labs so these problems can be resolved as soon as possible.

Status: Problem has been indirectly resolved by the ECHT moving to a new location on campus (Status: In Progress)

2. The department should consider establishing apprenticeships and internships. An apprenticeship program to help those students with little or no experience, would make ECC's electronic program much more competitive with sister campuses who offer such services

Status: The recommendations have been carried out in part. Summer 2011, Utility driven "boot-camp" was offered. 24 students are projected to complete this course. The graduates will go on to potentially complete a "skills certificate" in Power Line Technology.

(Status: In Progress)

3. Apprenticeships

Apprenticeship Power Line: This certificate program was abandoned because of lack of enrollment and Placement through a grant.

Status: Abandoned

Northrop Grumman Space Systems: High Reliability "J-Standard" electronic fabrication

Status: Ongoing

4. The department has a substantial need for updated instructional equipment and software. Faculty

The college should continue to address the near-term requirements of the program, through the "Academic Technology Committee and other sources of funding. These sources of money include VTEA, proceeds from Contract Ed, and from various types of Grants.

Status: The recommendations has been partially carried out

5. The ECHT department was tasked in participating in a "Green, Sustainable, and Energy Program". Although some faculty did attend various workshops, there wasn't true focus on institutional funding to support this program. In many cases, training, and equipment cost hampered the program's development to get this and other programs off the ground, there needs be a consorted effort with the Grant Writer.

Status: No Activity on this recommendation

6. The new El Camino grants officer should meet with department faculty to discuss sources of funding for conferences, workshops, and staff development.

Status: No Activity on this recommendation

The Validation Committee identified a number of activities extending beyond the classroom that contribute to the success of the program and that the faculty lacks the time to undertake.

These include: Recruiting visits to local high schools develop programs to promote and do "follow-up research on graduates of the program. Faculty should continue to work with the division dean to find ways in which the need for these activities can be met

Status: In Progress

Faculty from ECHT have participated in high school outreach, and Young Scholars, "First

Robotics,, and STEM Workshops to promote STEM interests in high tech vocations such as Electronics Technology/Engineering

Status: In Progress

7. The department should consider offering a variety of specialized courses that meet the current needs of its students and local industries.

Status: The recommendations have been partially carried out in part

We have developed: Power Line Technology, Computer Security/Forensics, and Microcontroller courses, this recommendation will be even further restricted due to the new facilities we recently moved into. The classrooms are fewer and smaller in instructional and laboratory square footage

Status: Computer Security/Forensics and Microcontroller courses have been created and approved. They're currently being offered as part of both degree and certificate requirements

Faculty has neither the time nor ability to seek out grant initiatives. The college should provide more institutional support to seek outside funding for "CTE" interests. This funding can greatly enhance the "cutting-edge" technology we provide to our students.

Status :New

2. Analysis of Research Data (include data provided by California Community Colleges Chancellor's Office and Institutional Research & Planning)

a) Head count of students in the program

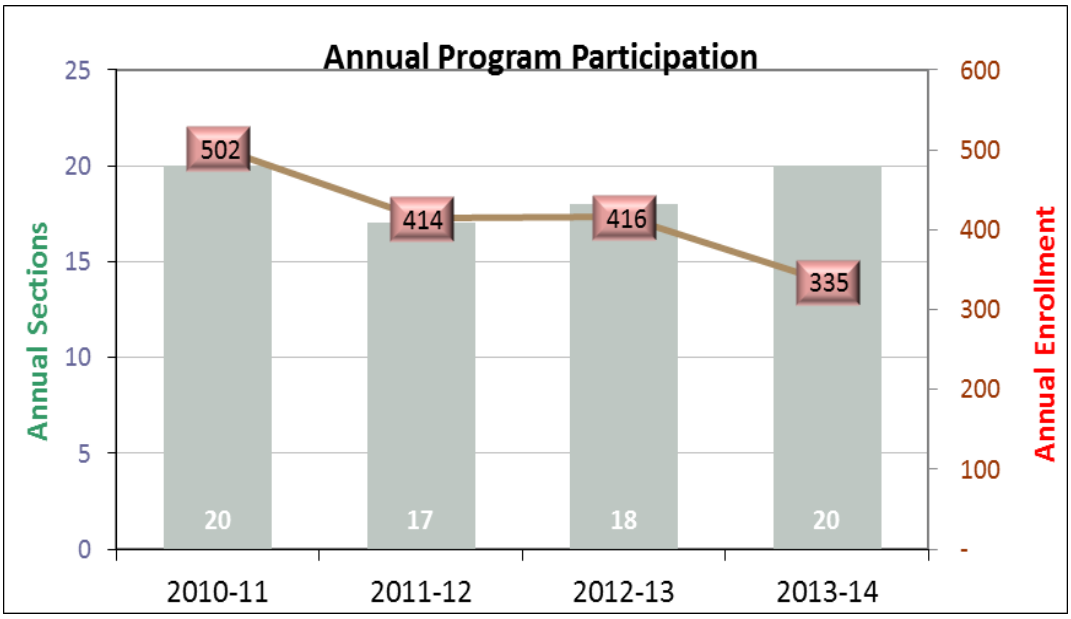
The data indicates significant student participation within the ECHT program over the last four years. These numbers as indicated by the data tables below show robust student support for the program

These numbers however will improve as the program evolves. The ECHT program is changing to reflect industry-changing demand. There will be an expected initial decline in enrolment as the

program evolves due to increased student demands, expected improvements in the economy and changing instruction methods. The program academic rigors are being extended to provide students a greater opportunity for employment and career mobility. The ECHT program outreaches will result in a more diverse student population into the program and stimulate program growth.

Electronics and Computer Hardware Technology Years: 2010-11 to 2013-14

Program Participation (4-year Trend)	2010-11	2011-12	2012-13	2013-14	4Yr Average
Annual Enrollment	502	414	416	335	417.75



Analysis of the Program participation

Academic year 2010 showed the largest year of participation in this four year sample. One possible reason why the Program Participation numbers decreased significantly in 2013-14, because more technical staffs were either added to the workforce, with overtime. When people are working, sometimes they'll sideline their education. Because of ne demands by some employers we should see an upward movement in numbers of the next couple of years.

Many of our industrial partners now require their employees to obtain at least a Certificate or AS degree, in a predetermined time, as a condition of employment. Boeing, Northrop, and Raytheon are especially concerned with their employs having a knowledge base of different methods of test and validation.

Recommendations:

1) Review the district policy on “credit-by-exam”
2) Revisit the “PACE” program for weekend college
3) Expand the course offering to accelerate student completion
4) Provide for more tutorial support in electronics
5) Award more credit for technical courses taken in the military.
6) Look at braking up courses into eight week accelerated modules

b. Course grade distribution

Analysis of Grade Distribution:

Grade Distribution, Success, and Retention
Electronics and Computer Hardware Technology
Spring

Program
Session Spring
Do Not select more than one term or Program.

Preliminary Success Standard 61.8%
5 year Success Average 66.0%
5 year Success Minimum 57.6%

Year	COURSE	Method	Weeks	Grade D 'A'	'B'	'C'	'P'	'D'	'F'	'NP'	Inc P	Inc NP	'DR'	'W'	Total	Succ.	Reten.
2011	ECHT-11	Lecture	16	16	10	13	-	2	16	-	-	1	5	18	81	48.1%	71.6%
	ECHT-110	Lecture	16	13	4	6	-	-	1	-	-	-	-	1	25	92.0%	96.0%
	ECHT-130	Lecture	16	6	8	1	-	1	2	-	-	1	-	2	21	71.4%	90.5%
	ECHT-140AB	Lecture	16	11	14	12	-	5	2	-	-	-	1	3	48	77.1%	91.7%
	ECHT-144AB	Lecture	16	5	8	9	-	-	-	-	-	-	1	6	29	75.9%	75.9%
	ECHT-191AB	Lecture	16	13	7	3	-	1	-	-	-	-	-	1	25	92.0%	96.0%
	ECHT-22	Lecture	16	8	5	-	-	2	3	-	-	-	2	6	26	50.0%	69.2%
2011 Total				72	56	44	-	11	24	-	-	2	9	37	255	67.5%	82.0%
2012	ECHT-11	Lecture	16	21	10	2	-	3	9	-	-	-	3	11	59	55.9%	76.3%
	ECHT-110	Lecture	16	9	5	6	-	2	2	-	-	-	1	3	28	71.4%	85.7%
	ECHT-124	Lecture	16	7	4	-	-	-	1	-	-	-	-	2	14	78.6%	85.7%
	ECHT-130	Lecture	16	5	2	2	-	3	1	-	-	2	3	5	23	39.1%	65.2%
	ECHT-140AB	Lecture	16	9	7	7	-	-	1	-	-	-	-	4	28	82.1%	85.7%
	ECHT-144AB	Lecture	16	7	9	7	-	-	4	-	-	-	-	-	27	85.2%	100.0%
	ECHT-22	Lecture	16	12	3	1	-	-	-	-	-	-	3	10	29	55.2%	55.2%
2012 Total				70	40	25	-	8	18	-	-	2	10	35	208	64.9%	78.4%
2013	ECHT-11	Lecture	16	6	12	11	-	1	10	-	1	1	-	10	52	57.7%	80.8%
	ECHT-110	Lecture	16	6	6	5	-	2	-	-	-	-	-	6	25	68.0%	76.0%
	ECHT-122	Lecture	16	5	9	2	-	-	1	-	-	4	-	2	23	69.6%	91.3%
	ECHT-130	Lecture	16	6	7	2	-	1	4	-	-	-	-	1	21	71.4%	95.2%
	ECHT-140AB	Lecture	16	5	9	6	-	3	2	-	-	-	-	12	37	54.1%	67.6%
	ECHT-144AB	Lecture	16	8	5	4	-	1	1	-	-	-	-	3	22	77.3%	86.4%
	ECHT-22	Lecture	16	11	1	4	-	-	3	-	-	-	-	9	28	57.1%	67.9%
2013 Total				47	49	34	-	8	21	-	1	5	-	43	208	63.0%	79.3%
2014	ECHT-11	Lecture	16	14	13	5	-	4	6	-	-	-	-	12	54	59.3%	77.8%
	ECHT-110	Lecture	16	4	5	2	-	1	-	-	-	-	-	2	14	78.6%	85.7%
	ECHT-124	Lecture	16	-	-	-	-	-	-	-	-	-	-	-	-		
	ECHT-130	Lecture	16	1	2	2	-	-	6	-	-	-	-	4	15	33.3%	73.3%
	ECHT-140AB	Lecture	16	2	4	7	-	6	1	-	-	-	-	11	31	41.9%	64.5%
	ECHT-144AB	Lecture	16	6	4	3	-	2	2	-	-	-	-	2	19	68.4%	89.5%
	ECHT-191AB	Lecture	16	19	9	2	-	1	-	-	-	-	-	1	32	93.8%	96.9%
	ECHT-22	Lecture	16	12	3	1	-	-	5	-	-	-	-	4	25	64.0%	84.0%
2014 Total				58	40	22	-	14	20	-	-	-	-	36	190	63.2%	81.1%

Grade Distribution, Success, and Retention
Electronics and Computer Hardware Technology
Fall

Program
Session Fall
Do Not select more than one term or Program.

Preliminary Success Standard	*61.8%*
5 year Success Average	*66.0%*
5 year Success Minimum	*57.6%*

Year	COURSE	Method	Weeks	Grade D 'A'	'B'	'C'	'P'	'D'	'F'	'NP'	Inc P	Inc NP	'DR'	'W'	*Total*	Succ.	Reten.
2010	ECHT-11	Lecture	16	20	14	6	-	6	24	-	-	-	2	12	*84*	47.6%	83.3%
	ECHT-110	Lecture	16	8	5	4	-	4	-	-	-	-	-	1	*22*	77.3%	95.5%
	ECHT-122	Lecture	16	5	3	2	-	1	-	-	-	2	-	-	*13*	76.9%	100.0%
	ECHT-130	Lecture	16	7	5	2	-	-	1	-	-	-	-	2	*17*	82.4%	88.2%
	ECHT-140AB	Lecture	16	2	7	12	-	1	5	-	-	-	-	-	*27*	77.8%	100.0%
	ECHT-142AB	Lecture	16	7	10	8	-	-	2	-	-	-	-	2	*29*	86.2%	93.1%
	ECHT-146AB	Lecture	16	2	7	12	-	1	1	-	-	-	-	1	*24*	87.5%	95.8%
	ECHT-22	Lecture	16	11	3	5	-	1	5	-	-	-	2	4	*31*	61.3%	80.6%
2010 Total				62	54	51	-	14	38	-	-	2	4	22	*247*	67.6%	89.5%
2011	ECHT-11	Lecture	16	24	7	7	-	3	8	-	-	-	6	12	*67*	56.7%	73.1%
	ECHT-110	Lecture	16	4	6	6	-	3	2	-	-	-	-	2	*23*	69.6%	91.3%
	ECHT-120	Lecture	16	7	9	-	-	-	2	-	-	1	-	3	*22*	72.7%	86.4%
	ECHT-130	Lecture	16	-	-	-	-	-	-	-	-	-	1	4	*5*	0.0%	0.0%
	ECHT-140AB	Lecture	16	2	8	9	-	-	5	-	-	-	1	4	*29*	65.5%	82.8%
	ECHT-142AB	Lecture	16	13	8	5	-	-	-	-	-	-	-	2	*28*	92.9%	92.9%
	ECHT-22	Lecture	16	13	2	2	-	3	5	-	-	-	1	4	*30*	56.7%	83.3%
2011 Total				63	40	29	-	9	22	-	-	1	9	31	*204*	64.7%	80.4%
2012	ECHT-11	Lecture	16	16	10	5	-	2	13	-	-	-	-	6	*52*	59.6%	88.5%
	ECHT-110	Lecture	16	4	6	2	-	1	1	-	-	-	-	3	*17*	70.6%	82.4%
	ECHT-120	Lecture	16	13	4	1	-	-	2	-	-	-	-	-	*20*	90.0%	100.0%
	ECHT-130	Lecture	16	15	2	1	-	-	2	-	-	-	-	3	*23*	78.3%	87.0%
	ECHT-140AB	Lecture	16	5	10	2	-	-	2	-	-	-	-	7	*26*	65.4%	73.1%
	ECHT-142AB	Lecture	16	5	8	3	-	3	4	-	-	-	-	1	*24*	66.7%	95.8%
	ECHT-148AB	Lecture	16	5	5	7	-	-	-	-	-	-	-	2	*19*	89.5%	89.5%
	ECHT-22	Lecture	16	9	5	1	-	-	9	-	-	-	-	2	*26*	57.7%	92.3%
2012 Total				72	50	22	-	6	33	-	-	-	-	24	*207*	69.6%	88.4%
2013	ECHT-11	Lecture	16	10	3	4	-	1	1	-	-	-	-	16	*35*	48.6%	54.3%
	ECHT-110	Lecture	16	4	4	1	-	2	2	-	-	-	-	1	*14*	64.3%	92.9%
	ECHT-120	Lecture	16	-	-	-	-	-	-	-	-	-	-	6	*6*	0.0%	0.0%
	ECHT-130	Lecture	16	-	-	-	-	-	-	-	-	-	-	-	-		
	ECHT-140AB	Lecture	16	-	8	3	-	2	6	-	-	-	-	3	*22*	50.0%	86.4%
	ECHT-142AB	Lecture	16	2	3	7	-	3	3	-	-	-	-	5	*23*	52.2%	78.3%
	ECHT-146	Lecture	16	2	4	2	-	3	1	-	-	-	-	9	*21*	38.1%	57.1%
	ECHT-22	Lecture	16	9	3	3	-	-	-	-	-	-	-	8	*23*	65.2%	65.2%
	ECHT-99ABC	Indepen	16	1	-	-	-	-	-	-	-	-	-	-	*1*	100.0%	100.0%
2013 Total				28	25	20	-	11	13	-	-	-	-	48	*145*	50.3%	66.9%

In analysis of course grading over the last four years the majority of students received a final grade of A or B. The number of "W's" concerns the faculty. We have concluded that students withdraw from their courses for number reasons. One of the major reasons our students tended to withdraw was, work shift change. Because of the economy growing, we have seen a cyclic change in our enrollment. The instructors in the ECHT program spend a great deal of time preparing students for

success however, time for both the lab and classroom is limited. Students need to spend more time in the lab with hands-on projects.

c) Success rates

d) Retention rates

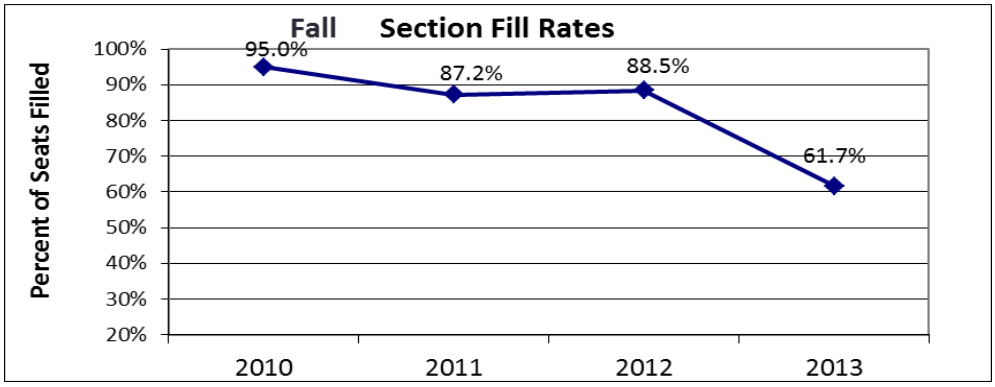
ECHT retention rates vary from course to course and from year to year. The averages vary between 85 - 95% and the four-year average retention rate is 81.3%. Many course retention rates are in the high 80-90%. These rates reflect instructor dedication, program refinements, industry focus, and demand. The rates also show that the department a met the "targeted" retention and success rates for most sections offered in this Program review cycle. These high retention rates could be directly related to instructor involvement in student success, as well our student's access to an electronics tutor, whose hours have been dramatically reduced over the past four years. Over the last year, the program instruction has been strengthened by recruitment and the utilization of very competent electronics adjunct faculty members. Program content has been extended to include micro controls, Net Plus, and Cyber Security. These additions provide the program a better alignment with industry needs. The expectation is that program retentions may fall due to program changes and instruction however, the long-term prospects are very favorable. Students completing the ECHT program will have the entry skills necessary to work in electronics service, installation, repair, maintenance, engineering support, and system automation, electrical and other related areas.

e) A comparison of success and retention rates in face-to-face classes with distance education classes

The ECHT program doesn't currently utilize distance learning.

f) Enrollment statistics with section and seat counts and fill rates

The strong numbers in 2010-11 reflect changes in the U.S. economy and the need for cross training. The decline after 2010 could be a reflection of improvement in the U.S. economy. According to the U.S. Department of Labor by 2020 65% of the electronic technicians in the field in 2010 will retire. This predicted shortage of Electronics Technician/Engineering. 2013 also showed a decrease in the program's "fill rates". This dramatic drop paralleled, inversely proportionally to the increase in employment, especially in skilled areas of employment of employment of trained Electronics Technician/Engineering Technologist. These technicians will support this industry and is expected to grow by over 20% by 2020. This will provide many opportunities for program growth, which the program is preparing for now.



Enrollment by Time of Day

Fall Term	2010	2011	2012	2013
Day	44.9%	44.8%	33.3%	32.1%
Night	55.1%	55.2%	66.7%	67.3%
Weekend/Unknown	0.0%	0.0%	0.0%	0.5%

g) Scheduling of courses (day vs. night, days offered, and sequence)

ELectronics and Computer Hardware Technology
Lising of Day and Evening Courses Fal 11-Summer 14

		Day	Evening			
		Monday	Tuesday	Wednesday	Thursday	Friday
Su 14	Course					
	ECHT-11	6-9:30 pm	6-9:30 pm	6-9:30 pm	6-9:30 pm	
	ECHT-95a	9- 1:30pm	9- 1:30pm	9- 1:30pm	9- 1:30pm	
SP 14	Course					
	ECHT-11	9:30- 12:40pm		9:30- 12:40pm		
	ECHT-11		9:30- 12:40pm		9:30- 12:40pm	
	ECHT -110	6-9:30 pm		6-9:30 pm		
	ECHT-130	6-9:30 pm		6-9:30 pm		
	ECHT-140	2:30-5:50pm		2:30-5:50pm		
	ECHT-144	6-9:30 pm		6-9:30 pm		
	ECHT-191		6-9:30 pm		6-9:30 pm	
	ECHT-22	1:30- 4:20pm		1:30- 4:20pm		
Fa 13	Course					
	ECHT-11	9:30- 12:40pm		9:30- 12:40pm		
	ECHT-11		6-9:30 pm		6-9:30 pm	
	ECHT-110		9:30- 12:40pm		9:30- 12:40pm	
	ECHT-120		6-9:30 pm		6-9:30 pm	
	ECHT-140	2:30-5:50pm		2:30-5:50pm		
	ECHT-142		2:30-5:50pm		2:30-5:50pm	
	ECHT-146	6-9:30 pm		6-9:30 pm		
	ECHT-22	6-9:30 pm		6-9:30 pm		
	ECHT-99A		6-9:30 pm		6-9:30 pm	
SP 13	Course					
	ECHT-11	9:30- 12:40pm		9:30- 12:40pm		
	ECHT-11		9:30- 12:40pm		9:30- 12:40pm	

	ECHT-11		6-9:30 pm		6-9:30 pm
	ECHT -110	6-9:30 pm		6-9:30 pm	
	ECHT-122		6-9:30 pm		6-9:30 pm
	ECHT-130		9:30- 12:40pm		9:30- 12:40pm
	ECHT-140	2:30-5:50pm		2:30-5:50pm	
	ECHT-22	1:30- 4:20pm		1:30- 4:20pm	
Fa 12	Course				
	ECHT-11	9:30- 12:40pm		9:30- 12:40pm	
	ECHT-11		9:30- 12:40pm		9:30- 12:40pm
	ECHT-11		6-9:30 pm		6-9:30 pm
	ECHT-110	9:30- 12:40pm		9:30- 12:40pm	
	ECHT-120		6-9:30 pm		6-9:30 pm
	ECHT-130	9:30- 12:40pm		9:30- 12:40pm	
	ECHT-140	2:30-5:50pm		2:30-5:50pm	
	ECHT-142	6-9:30 pm		6-9:30 pm	
	ECHT-148		6-9:30 pm		6-9:30 pm
	ECHT-22	6-9:30 pm		6-9:30 pm	
SP 12	Course				
	ECHT-11	9:30- 12:40pm		9:30- 12:40pm	
	ECHT-11		9:30- 12:40pm		9:30- 12:40pm
	ECHT-11		6-9:30 pm		6-9:30 pm
	ECHT -110	6-9:30 pm		6-9:30 pm	
	ECHT-124	6-9:30 pm		6-9:30 pm	
	ECHT-130		6-9:30 pm		6-9:30 pm
	ECHT-140	2:30-5:50pm		2:30-5:50pm	
	ECHT-144	6-9:30 pm		6-9:30 pm	
	ECHT-22	1:30- 4:20pm		1:30- 4:20pm	
Fa 11	Course				
	ECHT-11	9:30- 12:40pm		9:30- 12:40pm	
	ECHT-11		9:30- 12:40pm		9:30- 12:40pm
	ECHT-11		6-9:30 pm		6-9:30 pm
	ECHT-110	9:30- 12:40pm		9:30- 12:40pm	
	ECHT-120		9:30- 12:40pm		9:30- 12:40pm
	ECHT-130	6-9:30 pm		6-9:30 pm	

Students need to spend more time developing their skills in the lab. The ECHT program is looking at extending its class offering schedule to Friday and Saturday. It was discussed in our Advisory Meeting a number of years ago that; local companies need a highly trained, degreed workforce to stay competitive. Because of varying shifts, some of their employees have difficult access to our class offerings. It was suggested that we offer Friday evening and possible Saturday and Sunday class offerings.

Open labs where students can turn their weaknesses into strengths. Increasing access to skill development could turn frustrated C and D students into A or B students. The electronics industry skills require extensive practice, study and exposure to new emerging technologies. The electronics industry includes trades within trades that require extensive knowledge well beyond those of most other careers. Providing students with additional skill development time could go a long way in student grades and success.

Other areas of improvements are listed below:

1) Develop more “Stackable Certificates
2) Better sequencing of class offerings
3) Review the district policy on “credit-by-exam

4) Revisit the "PACE" program for weekend college
5) Expand the course offering to accelerate student completion

i) Additional data compiled from faculty

Demographic and Enrollment Characteristics
Electronics and Computer Hardware Technology

Fall
Will show 0.0% if you did not select Program AND Term on the Academics Tab

Fall ***ECC Student Population*** ***District Boundary Population***

Term	2010	2011	2012	2013	Fall 2013	2010 Census	
Term Headcount	198	202	167	163	23,409	556,400	

Gender

F	6.6%	7.4%	6.6%	11.0%	52.6%	51.0%
M	92.9%	92.6%	93.4%	89.0%	49.9%	49.0%

Ethnicity

African-American	16.2%	12.9%	13.8%	11.7%	17.3%	15.1%
Amer. Ind. or Alaska Native	1.5%	1.0%	1.2%	0.6%	0.2%	0.2%
Asian	13.1%	12.9%	12.0%	16.0%	15.7%	13.6%
Latino	43.4%	42.6%	47.3%	44.8%	48.9%	34.5%
Pacific Islander	0.0%	0.5%	0.0%	1.2%	0.5%	0.5%
White	17.2%	23.8%	19.8%	20.9%	14.6%	32.8%
Two or More	3.0%	1.5%	3.6%	4.3%	4.1%	2.9%
Unknown or Decline	5.6%	5.0%	2.4%	0.6%	1.2%	0.4%

Term	2010	2011	2012	2013	Fall 2013	2010 Census
Age/ Age Group						
<17	0.0%	0.0%	0.6%	0.0%	0.5%	24.2%
17	0.5%	1.5%	1.2%	0.0%	2.1%	
18	6.1%	7.4%	3.6%	6.1%	12.2%	2.5%
19	11.6%	9.4%	8.4%	9.8%	15.1%	
20	14.1%	10.4%	13.2%	8.6%	13.3%	1.2%
21	10.1%	6.4%	7.8%	9.8%	10.1%	1.2%
22	8.6%	5.0%	5.4%	7.4%	7.6%	3.9%
23	5.1%	7.4%	6.6%	8.6%	6.1%	
24	2.5%	6.9%	4.8%	5.5%	4.7%	
25-29	14.1%	19.3%	21.6%	16.6%	13.5%	7.4%
30-39	14.6%	13.4%	15.6%	14.7%	9.1%	14.9%
40-49	8.6%	6.9%	4.8%	4.9%	4.1%	15.9%
50-64	4.0%	5.4%	4.8%	6.1%	3.3%	18.1%
65+	0.0%	0.5%	1.8%	1.8%	0.7%	10.6%

Class Load

Full-time	30.8%	29.7%	22.8%	25.2%	34.0%
Part-time	69.2%	70.3%	77.2%	74.8%	68.5%

Academic Level

College degree	12.6%	9.9%	13.8%	12.9%	12.0%
HS Grad	80.3%	86.6%	81.4%	81.0%	85.7%
Not a HS Grad	4.5%	1.5%	3.0%	0.6%	1.4%
K-12 Special Admit	0.5%	0.0%	0.0%	0.0%	1.0%
Unknown	2.0%	2.0%	1.8%	5.5%	1.9%

Educational Goal

Intend to Transfer	25.8%	34.2%	32.9%	23.9%	31.0%
Degree/Certificate Only	8.1%	5.9%	4.2%	4.9%	3.8%
Retrain/re certify	3.5%	4.5%	6.6%	5.5%	3.4%
Basic Skills/GED	3.5%	2.5%	3.0%	3.7%	5.8%
Enrichment	6.6%	5.9%	1.8%	5.5%	2.4%
Undecided	13.6%	13.4%	15.6%	16.0%	17.2%
Unstated	38.9%	33.7%	35.9%	40.5%	35.0%

Demographic and Enrollment Characteristics

Electronics and Computer Hardware Technology

Spring

Will show 0.0% if you did not select Program AND Term on the Academics Tab

Spring ECC Student Population District Boundary Population

Term	2011	2012	2013	2014	Spring 2014	2010 Census
Term Headcount	212	167	172	164	22,660	556,400

Gender

F	7.1%	7.8%	8.1%	11.6%	51.0%
M	92.5%	92.2%	91.9%	88.4%	49.0%

Ethnicity

African-American	13.2%	14.4%	16.9%	11.0%	16.6%	15.1%
Amer. Ind. or Alaska. Native	0.9%	0.6%	0.6%	0.6%	0.2%	0.2%
Asian	16.0%	12.0%	11.6%	9.8%	16.0%	13.6%
Latino	45.8%	51.5%	45.9%	53.0%	45.1%	34.5%
Pacific Islander	0.0%	0.0%	0.6%	0.6%	0.5%	0.5%
White	17.0%	19.8%	19.2%	19.5%	15.9%	32.8%

Two or More	1.9%	0.0%	2.3%	4.9%	4.0%	2.9%
Unknown or Decline	5.2%	1.8%	2.9%	0.6%	1.7%	0.4%

Age/ Age Group

<17	0.0%	0.0%	0.0%	0.0%	0.2%	24.2%	
17	0.9%	0.0%	0.0%				0.0%	0.6%
18	6.6%	6.0%	9.3%	5.5%	9.8%	2.5%	
19	10.8%	12.0%	8.7%	10.4%	14.8%	1.2%	
20	9.9%	10.2%	10.5%	9.8%	13.6%	1.2%	
21	10.4%	9.0%	7.0%	9.8%	10.4%	1.2%	
22	7.5%	9.0%	4.1%	6.1%	8.0%	3.9%	
23	6.1%	6.6%	6.4%	6.7%	6.0%		
24	5.7%	4.8%	6.4%	3.0%	4.7%		
25-29	15.1%	16.2%	16.9%	23.2%	13.4%	7.4%	
30-39	14.6%	14.4%	15.7%	11.6%	9.4%	14.9%	
40-49	4.7%	4.8%	4.1%	5.5%	4.4%	15.9%	
50-64	5.7%	6.0%	8.1%	7.3%	3.7%	18.1%	
65+	1.9%	1.2%	2.9%	1.2%	0.9%	10.6%	

Class Load

Full-time	26.9%	23.4%	18.6%	27.4%	26.7%
Part-time	73.1%	76.6%	79.7%	72.6%	69.0%

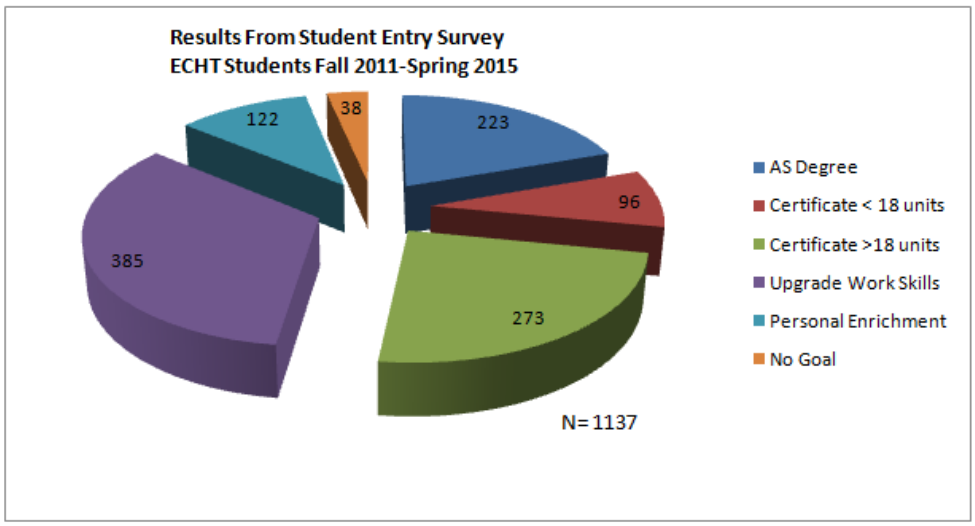
Academic Level

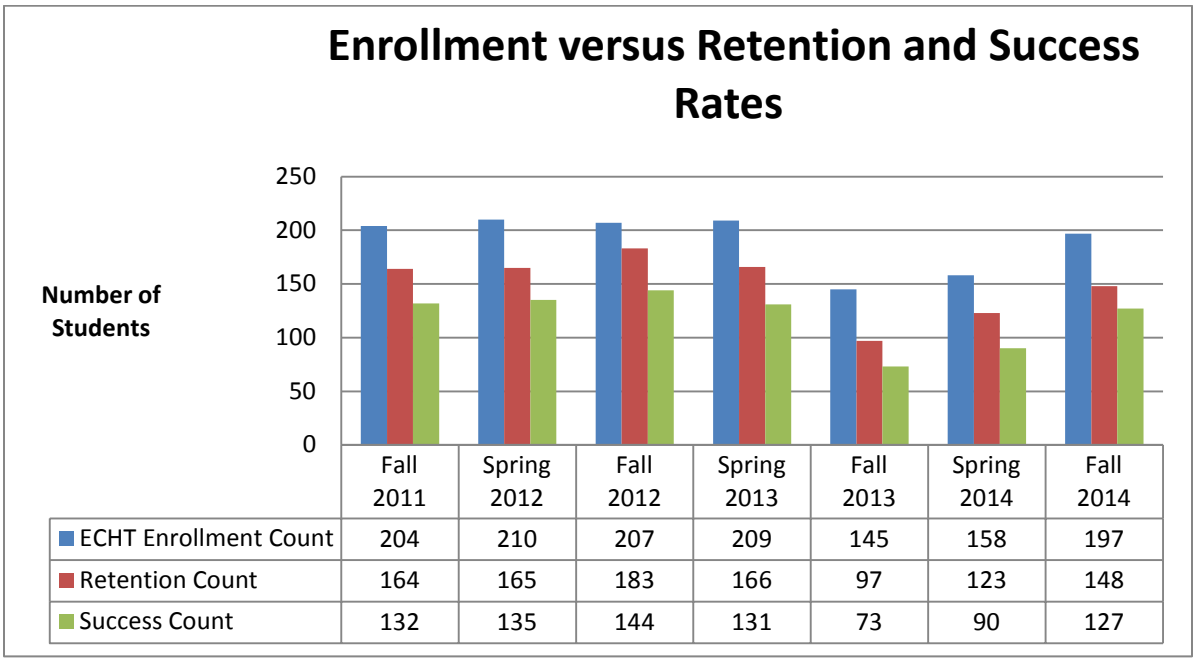
College degree	15.6%	9.6%	11.6%	16.5%	12.3%
HS Grad	76.9%	83.2%	83.1%	76.2%	83.8%
Not a HS Grad	4.2%	3.6%	0.6%	0.6%	0.5%
K-12 Special Admit	0.5%	0.0%	0.0%	0.0%	0.6%
Unknown	2.8%	3.6%	4.7%	6.7%	2.9%

Educational Goal

Intend to Transfer	27.4%	24.0%	25.0%	25.6%	31.0%
Degree/Certificate Only	6.1%	5.4%	5.8%	4.9%	3.9%
Retrain/re certif.	4.7%	6.0%	6.4%	8.5%	3.6%

Basic Skills/GED	4.7%	5.4%	6.4%	4.3%	5.6%
Enrichment	6.6%	3.6%	1.2%	2.4%	4.2%
Undecided	17.9%	17.4%	16.9%	13.4%	16.2%
Unstated	32.5%	38.3%	38.4%	40.9%	35.5%





	Fall 2011	Spring 2012	Fall 2012	Spring 2013	Fall 2013	Spring 2014	Fall 2014	4 year Ave
ECHT Enrollment Count	**204**	**210**	**207**	**209**	**145**	**158**	**197**	**190**
Retention Rate	**80.4%**	**78.6%**	**88.4%**	**81.3%**	**66.9%**	**77.9%**	**75.1%**	**79.5%**
Success Rate	**64.7%**	**64.3%**	**69.7%**	**88.4%**	**79.4%**	**50.3%**	**64.5%**	**68.8%**

(j) List any related recommendations.

3. Curriculum

Review and discuss the curriculum work done in the program during the past four years, including the following:

a) Provide the curriculum course review timeline to ensure all courses are reviewed at least six years

The Electronics and Computer Hardware Technology program is a Career Technical Education, CTE program, which requires a two-year cycle on curriculum review. This time line includes 2014 and every two years after. The ECHT program review at the unit level includes a complete evaluation every year and reflects changing industry and student needs. The program review includes curriculum review. Course review and updates align with industry and student needs to maintain program relevance.

Course	Units	Description	Time line	Status
ECHT 11	3	Introduction to Electronics	2016-18	Active
ECHT 22	3	Basic Electronic Fabrication	2015-16	Pending
ECHT 50	1-3	Special Topics in Electronics and Computer Hardware Technology	2015-16	Active
ECHT 62	3	Introduction to the Electric Power Industry	2015-16	Pending deletion
ECHT 64	3	Electric Power Industry Safety	2015-16	Pending deletion
ECHT 68		Electric Power Transmission and Distribution Systems	2015-16	Pending deletion
ECHT 95abcd	2-4	Cooperative Career Education	2015-16	Active
ECHT 99abc	1-3	Independent Study	2016-17	Active
ECHT 110	3	Introduction to Direct and Alternating Current Circuits	2016-18	Active
ECHT 120	3	Semiconductor Circuits I	2015-17	Active
ECHT 122	3	Semiconductor Circuits II	2015-17	Active
ECHT 124	3	Operational Amplifiers and Linear Integrated Circuits	2015-17	Active
ECHT 130	3	Digital Systems and Computer Logic I	2016-18	Active
ECHT 140	4	Computer Systems and Hardware Technologies I	2015-16	Active

ECHT 142	4	Computer Systems and Hardware Technologies II	2015-16	Active
ECHT 144	4	A+ Certification Preparation for Computer Hardware Systems	2015 -16	Active
ECHT 146	4	CompTIA Network+ Certification Preparation for Computer Hardware Systems	2015-16	Active
ECHT 148	4	CompTIA Security+ Certification Preparation for Computer Hardware Systems	2015-16	Active
ECHT 191	3	Introduction to Microprocessors and Interfacing	2015-16	Active

b) Explain any course additions to current course offerings.

None

c) Course revisions, deletions, and inactivations from current course offerings

Because the Chancellor's changes regarding course repeatability, was changed, since our last Program Review, the 140, Computer Technology series went through listing changes below.

Old Class Numbers	New Class Numbers
ECHT 140abc	ECHT 140
ECHT 142abc	ECHT 142
ECHT 144abc	ECHT 144
ECHT 146abc	ECHT 146
ECHT 148abc	ECHT 148

Since the last Program Review, we deactivated all of the communications and Power Line Technology courses. The reason why we proceeded with the deactivation of our Communication courses, and subsequent certificates, because of the "very tight' enrollment management policy that has been in effect since 2008. Each faculty member was limited on load.

As to the Power Line Technology, we assumed from representatives from Southern California Edison and the LA Department of Water and Power, that the program would be received well because of the shortages the anticipated in their workforce. But the reality was, a number of sister campus , East LA, Santa Monica, and Santiago Canyon Colleges, over built capacity, and diluted the pool our anticipated students.

The ECHT department resubmitted the courses for deactivation because the courses were not offered for credit within the past three years.

As mentioned above, and the reasoning behind the deactivations. The ECHT department asked, and submitted documents to both the Division and College Curriculum Committee for deactivation of ECHT 20, 62, 64, , 68, 112 ,131, 150, 152, 190, 192, 193, and 194. The deactivations were initiated during the

2012-2013 Academic Year. It was reported back that, ECHT 20,112, 131, 150, 152, 190, 192, 193, and 194

ECHT 62, 64, had been halted in the deactivation process of activated, and ECHT 68 reactivated, to be used for credit in a "Careers Academy" program. ECHT 62, 64, and 68 were never offered again for credit. Since they have not been offered for six consecutive semester ,we're currently seeking inactivation.

d) Describe the courses and number of sections offered in distance education. (Distance education includes hybrid courses.)

No distance education currently offered.

e) Discuss how well the courses, degrees, or certificates are meeting students' transfer or career training needs:

1. Have all courses that are required for your program's degrees and certificates been offered during the last two years? If not, has the program established a course offering cycle? Yes

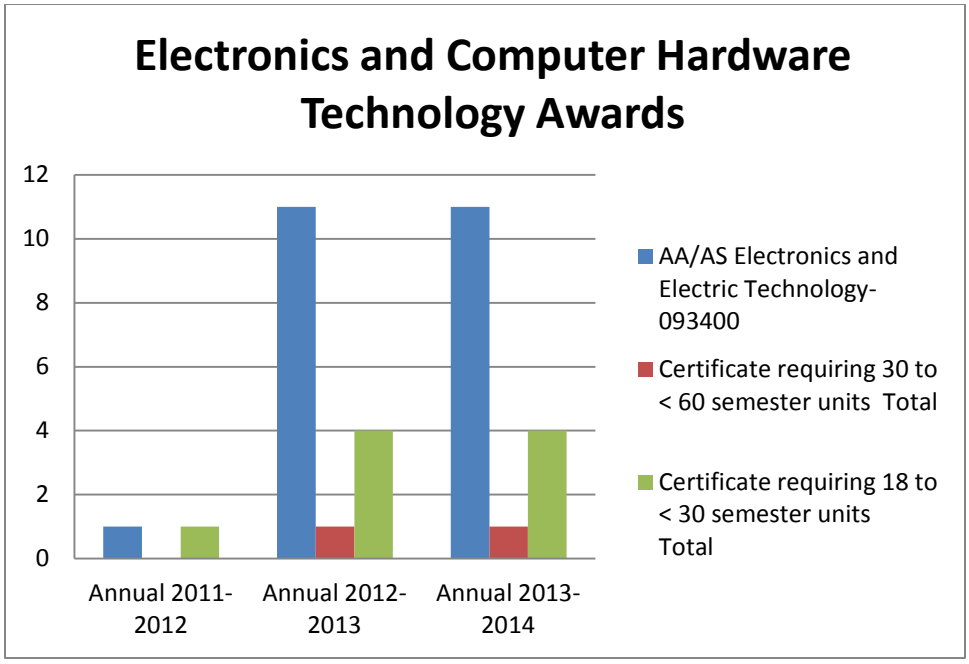
2. Are there any concerns regarding program courses and their articulation? Yes.

Over the past ten years, the CSU have reduced, if not eliminated transfer options for our students wanting either a BS in engineering Technology or Industrial Technology. I was our hope that ECC would be included in one of the community colleges a BS in either Industrial or Engineering Technology.

Our industrial partners, Boeing, Raytheon, Aerospace Corp., and JPL have conveyed to us their need for degreed Engineering Technologist.

CSU Dominguez Hills does have an "Applied Technology" Program where students take most if not all courses in a "hybrid" setting. The problem here, students are not earning a "technical - degree". Students can transfer their electronics technology credits, from El Camino, towards the Applied Technology degree.

e) How many students earn degrees and/or certificates in your program?



Do students take licensure exams? If so, what is the pass rate?

In the computer repair option, many students take the COMPTIA Certification exams for A+, Net+, and Security+.
For those students who take the independently administrated exam, Pass Rates are:
1. A+ ≥ 90%
2. Net+ ≥ 65%
3. Security+ ≥ 65%

If few students receive degrees or certificates or if few students pass the licensure exam, should the program's criteria or courses be re-examined?

The data indicated in the chart "Electronics and Computer Hardware Technology Awards" indicate a student interest in both the AS degree and Certificate of Accomplishment, 19 < 30 units. The number of students taking passing the CompTIA licensure depend on:

1) Some student can't afford the cost of the exam.
2) When students finally take the test, how long has it been since the student finished the specialized training?

f) List related recommendations.

1. I would like to see both our AS degree and Certificate rates increase by 50% by the next Program Review
2. Set an attainable, measurable goal for future degrees, certificates, and/or licensure pass rates
3. If the CompTIA examination were to be offered on campus, **at a student lower cost**, the success rates should go up! Establish El Camino College as an approved CompTIA testing center.

4. Explore Foundation, Scholarship, grants, and private support to enable these students o take these test and enter the workforce.

4. Assessment of Student & Program Learning Outcomes

SLOs	SLO to PLO Alignment (Mark with an X)			COURSE to ILO Alignment *FOR OFFICE USE ONLY*			
	P1	P2	P3	1	2	3	4
ECHT 11 Introduction to Electronics: SLO #1 Measuring Voltages and Currents Measuring Voltage and Current The student will make basic "in-circuit" measurements: Alternating Current/Direct Current (AC/DC), Voltages and Currents, and Resistance, using both a Bench and Portable Digital Multimeter (DMM).	X	X	X				
ECHT 11 Introduction to Electronics: SLO #2 Experimental Data and Analysis Reporting The students will be able to incorporate experimental data and analysis reporting protocols, using either "paper" or "paperless" environments, similar to data reporting and analysis used by many Electronics Manufacturers and Service Organizations.	X	X	X	X	X	X	X
ECHT 11 Introduction to Electronics: SLO #3 Circuit Analysis Calculations The students will be able to use various circuit analysis calculations to predict basic circuits operation.		X	X				
ECHT 110 Introduction to Direct and Alternating Current Circuits: SLO #1 Measuring Voltage, Current & Resistance The student will make advanced "in- circuit" measurements : Alternating Current/Direct Current (AC/DC), Voltages, Currents, and Resistance, using both a Bench and Portable Digital Multimeter (DMM).	X	X	X				
ECHT 110 Introduction to Direct and Alternating Current Circuits: SLO #2 Direct & Alternating Currents The student will use an Electronic Simulation Software Package similar to Multi-SIM or "P" Spice to supplement both the understanding and analysis of Direct and Alternating Current Circuits.	X	X	X	X	X	X	X
ECHT 110 Introduction to Direct and Alternating Current Circuits: SLO #3 Circuit Analysis Calculations The students will be able to use various circuit analysis calculations to predict basic circuits operation.		X	X				
ECHT 120 Semiconductor Circuits I: SLO #1 In-Circuit Measurements The student will make basic "in-circuit" measurements using Bench and Portable Digital Multimeter (DMM), Oscilloscope, and Voltage Ohm (VOM), Milliamp Meter on Solid-State Systems.		X	X				
ECHT 120 Semiconductor Circuits I: SLO #2 Experimental Data and Analysis Reporting The student will be able to use various circuit analysis calculations to predict basic circuit operation.	X	X	X	X	X	X	X
ECHT 120 Semiconductor Circuits I: SLO #3 Advanced In-Circuit Measurements The student will make advanced "in-circuit" measurements using Bench and Portable Digital Multimeter (DMM), Oscilloscope, and Voltage Ohm (VOM), Milliamp Meter on Solid-State-Systems.	X	X	X				

SLOs	SLO to PLO Alignment (Mark with an X)			COURSE to ILO Alignment *FOR OFFICE USE ONLY*			
	P1	P2	P3	1	2	3	4
ECHT 122 Semiconductor Circuits II: SLO #1 Measuring Voltages and Currents Measuring Voltage and Current The student will make basic "in-circuit" measurements: Alternating Current/Direct Current (AC/DC), Voltages and Currents, and Resistance, using both a Bench and Portable Digital Multimeter (DMM).	X	X	X				
ECHT 122 Semiconductor Circuits II: SLO #2 Field Effect Amplifier Given a schematic diagram of a basic Field Effect Amplifier, the students will be able to assemble, test and measure the circuit for its operational parameters.		X	X	X	X	X	X
ECHT 122 Semiconductor Circuits II: SLO #3 Experimental Data and Analysis Reporting The students will be able to incorporate experimental data and analysis reporting protocols, using either "paper" or "paperless" environments, similar to data reporting and analysis used by many Electronics Manufacturers and Service Organizations.		X	X				
ECHT 124 Operational Amplifiers and Linear Integrated Circuits: SLO #1 Operational Amplifier Given a schematic diagram of a basic Operational Amplifier (Op) with negative feedback, the students will be able to assemble, test and measure the circuit for its operational parameters.	X	X	X				
ECHT 124 Operational Amplifiers and Linear Integrated Circuits: SLO #2 Advanced In-Circuit Measurements The student will make advanced "in-circuit" measurements using Bench and Portable Digital Multimeter (DMM), Oscilloscope, and Voltage Ohm (VOM), Milliamp Meter, on Advanced Solid-State-Systems.		X	X	X	X	X	X
ECHT 124 Operational Amplifiers and Linear Integrated Circuits: SLO #3 Experimental Data and Analysis Reporting The students will be able to incorporate experimental data and analysis reporting protocols, using either "paper" or "paperless" environments, similar to data reporting and analysis used by many Electronics Manufacturers and Service Organizations.		X	X				
ECHT 130 Digital Systems and Computer Logic I: SLO #1 DeMorgan's Theorem The student will use DeMorgan's Theorem to reduce a Boolean Statement in its simplest terms.		X	X				
ECHT 130 Digital Systems and Computer Logic I: SLO #2 Basic Function Gates The student will use discrete NOR and NAND Gates to construct all seven basic function gates (NOT, OR, NOR, AND, NAND, EXOR, and EXNOR).		X	X	X	X	X	X
ECHT 130 Digital Systems and Computer Logic I: SLO #3 Experimental Data and Analysis Reporting The students will be able to incorporate experimental data and analysis reporting protocols, using either "paper" or "paperless" environments, similar to data reporting and analysis used by many Electronics Manufacturers and Service Organizations.		X	X				

SLOs	SLO to PLO Alignment (Mark with an X)			COURSE to ILO Alignment *FOR OFFICE USE ONLY*			
	P1	P2	P3	1	2	3	4
ECHT 140 Computer Systems and Hardware Technology I: SLO #1 Course Notebook The students will assemble and maintain a five-section course notebook.		X	X	X	X	X	X
ECHT 140 Computer Systems and Hardware Technology I: SLO #Component Handling Techniques The student will be able to demonstrate their knowledge in proper component handling techniques, especially regarding (ESD), Electrostatic Discharge.	X	X	X				
ECHT 140 Computer Systems and Hardware Technology I: SLO #3 Computer Estimate and Configuration The student will be able to demonstrate their ability to cost out and configure either a Business or "Gaming" Computer per customer specifications.		X	X				
ECHT 142 Computer Systems and Hardware Technology II: SLO #1 Course Notebook The students will assemble and maintain a five-section course notebook.		X	X	X	X	X	X
ECHT 142 Computer Systems and Hardware Technology II: SLO #2 Troubleshooting Techniques The student will be able to demonstrate advanced skill levels in their knowledge of repairing computer systems using system troubleshooting techniques introduced within the scope of the class.	X	X	X				
ECHT 142 Computer Systems and Hardware Technology II: SLO #3 OEM Specifications The student will be able to demonstrate their knowledge in using commercially available diagnostic tools to verify a system meets original equipment manufacturer (OEM) specifications.		X	X				
ECHT 144 CompTIA A+ Certification Preparation for Computer Hardware Systems: SLO #1 Course Notebook The students will assemble and maintain a five-section course notebook.		X	X	X	X	X	X
ECHT 144 CompTIA A+ Certification Preparation for Computer Hardware Systems: SLO #2 CompTIA Industry Certification The student will acquire a knowledge base to prepare to take the A+ Certification Exam through CompTIA, an industry recognized certification.	X	X	X				
ECHT 144 CompTIA A+ Certification Preparation for Computer Hardware Systems: SLO #3 Electricity & Electronics The student will acquire knowledge in safety and the basics of electricity and electronics, micro-computer hardware and components.		X	X				

The students will assemble and maintain a five-section course notebook.							
ECHT 146 CompTIA Network+ Certification Preparation for Computer Hardware Systems: SLO #2 CompTIA Network+ Certification Exam Students will develop the skills and knowledge required for passing the CompTIA Network+ Certification exam. Topics include set up configuration and troubleshooting of networking hardware devices. Other areas explored include networking topology, cabling, wireless devices, network standards, protocols and security.	X	X	X	X	X	X	X
ECHT 146 CompTIA Network+ Certification Preparation for Computer Hardware Systems: SLO #3 Open Systems Interconnection Students will demonstrate their knowledge of Open Systems Interconnection (OSI), the seven layers of the OSI model, protocol and data packets, and the standard network model.		X	X				
ECHT 148 CompTIA Security+ Certification Preparation for Computer Hardware Systems: SLO #1 Course Notebook The students will assemble and maintain a five-section course notebook.		X	X	X	X	X	X
ECHT 148 CompTIA Security+ Certification Preparation for Computer Hardware Systems: SLO #2 Information Security Students will demonstrate their knowledge of information security, system threats and risks, protecting systems, network vulnerabilities, network defenses, wireless network security, security audits and policies, cryptographic methods, and the basics of computer forensics.	X	X	X				
ECHT 148 CompTIA Security+ Certification Preparation for Computer Hardware Systems: SLO # Cybersecurity Students will demonstrate their knowledge of "Chain of Custody" handling procedures of physical evidence in matters of cybersecurity.		X	X				
ECHT 191 Introduction to Microprocessors and Interfacing: SLO #1 Machine Assembly Language Students will demonstrate their knowledge of fundamentals of machine assembly language.		X	X	X	X		X
ECHT 191 Introduction to Microprocessors and Interfacing: SLO #2 Digital & Analog Interfacing Students will demonstrate their use of software to simulate hardware and digital and analog interfacing.		X	X				
ECHT 191 Introduction to Microprocessors and Interfacing: SLO #3 Microprocessors and Microcontrollers Students will demonstrate their knowledge of microprocessors and microcontrollers as they relate to industrial and consumer equipment.		X	X				
ECHT 192 Robotics and Machine Control: SLO #1 Testing, Operating and Debugging After completing structured assignments that introduce basic concepts and applications, and of a Microcontroller/Microprocessor, the student use the information learned to successfully test, operate, program, and debug a Microcontroller/Microprocessor.		X	X	X	X		X

SLOs	SLO to PLO Alignment (Mark with an X)			COURSE to ILO Alignment *FOR OFFICE USE ONLY*			
	P1	P2	P3	1	2	3	4
ECHT 22 Basic Electronic Fabrication: SLO #1 Tools &Test Equipment Upon successful completion of this course, students will be able to identify and safely operate/manipulate various types of electronic hand tools and test equipment.	X	X					
ECHT 22 Basic Electronic Fabrication: SLO #2 Experimental Data and Analysis Reporting The students will be able to incorporate experimental data and analysis reporting protocols, using either "paper" or "paperless" environments, similar to data reporting and analysis used by many Electronics Manufacturers and Service Organizations.	X		X	X	X	X	X
ECHT 22 Basic Electronic Fabrication: SLO #3 Low Voltage Power Supply Upon successful completion of this course, students will be able to produce a functional low voltage, direct current (DC) power supply project sample that meets predetermined specifications and which could be potentially mass produced.		X	X				
ECHT 62 Introduction to the Electric Power Industry: SLO #1 Electrical Theory Students will demonstrate a basic knowledge of power generation, transmission, and basic electrical theory.		X		X	X		X
ECHT 64 Electric Power Industry Safety: SLO #1 OSHA Safety Exam Students will be able to successfully pass the examination for the OSHA (30 Hour) safety-training certificate.	X	X		X	X	X	X

b) Provide a timeline for course and program level SLO assessments.

SLO Timeline *Worksheet*

Division: Industry & Technology **Program:** ECHT **Program Review Date:** 2016

Directions: Use this worksheet to schedule assessments for each SLO Statement over the four-year timeline. When complete, return to your facilitator by January 31 for input into TracDat.

Course and SLO #	Note if offered only in FA/SU/SP	SP 2014	SU 2014	FA 2014	SP 2015	SU 2015	FA 2015	SP 2016	SU 2016	FA 2016	SP 2017	SU 2017	FA 2017
ECHT Program #1				**X**									**X**
ECHT Program #2					**X**								
ECHT Program #3										**X**			
ECHT 11 SLO #1				X									X
ECHT 11 SLO #2				X									X
ECHT 11 SLO #3				X									X
ECHT 22 SLO #1					X								
ECHT 22 SLO #2					X								
ECHT 22 SLO #3					X								
ECHT 110 SLO #1								X					
ECHT 110 SLO #2										X			
ECHT 110 SLO #3								X					
ECHT 120 SLO #1							X						
ECHT 120 SLO #2										X			
ECHT 120 SLO #3													X
ECHT 122 SLO #1	FALL									X			X
ECHT 122 SLO #2	FALL									X			X
ECHT 122 SLO #3	FALL						X						
ECHT 124 SLO #1	SPRING							X					
ECHT 124 SLO #2	SPRING										X		
ECHT 124 SLO #3	SPRING							X					

Course and SLO #	Note if offered only in FA/SU/SP	SP 2014	SU 2014	FA 2014	SP 2015	SU 2015	FA 2015	SP 2016	SU 2016	FA 2016	SP 2017	SU 2017	FA 2017
ECHT 130 SLO #1							X						
ECHT 130 SLO #2								X					
ECHT 130 SLO #3													X
ECHT 140 SLO #1											X		
ECHT 140 SLO #2											X		
ECHT 140 SLO #3											X		
ECHT 142 SLO #1	FALL									X			
ECHT 142 SLO #2	FALL									X			
ECHT 142 SLO #3	FALL									X			
ECHT 144 SLO #1	SPRING							X					
ECHT 144 SLO #2	SPRING							X					
ECHT 144 SLO #3	SPRING							X					
ECHT 146 SLO #1	FALL									X			
ECHT 146 SLO #2	FALL									X			
ECHT 146 SLO #3	FALL									X			
ECHT 148 SLO #1	SPRING				X								
ECHT 148 SLO #2	SPRING				X								
ECHT 148 SLO #3	SPRING				X								
ECHT 191 SLO #1	SPRING				X								
ECHT 191 SLO #2	SPRING	X											
ECHT 191 SLO #3	SPRING							X					

c) State the percent of course and program SLO statements that have been assessed.

All ECHT courses have been assessed at least once since the inception of the SLO's. As illustrated in the timeline all courses, if offered will be assessed

d) Summarize the SLO and PLO assessment results over the past four years and describe how those results led to improved student learning. Analyze and describe those changes. Provide specific examples.

Within the ECHT department, there is a keen awareness of the importance of aligning the course and program SLO's with actual student needs. Each department member aligns course work to align with SLO outcomes and communicates to student course outcomes and directions. The primary goal of the ECHT programs is student long-term career success. Over the last year each of the courses in the ECHT program had their SLO's updated and expanded from one to three SLO's. Each of the SLO's have been fully reviewed and updated to reflect industry demands and student needs. Each instructor in the program strives for student success and by implementing SLO's in many of student's assignments and activities. The PLO's and SLO's are a reflection of program direction with a focus on Test and measurements, industry acceptable data reporting, circuit trouble shooting solutions and student skill alignment with industry needs.

Student success in the ECHT program is linked to applied experiences. Over the last year, the ECHT program has invested heavily in the technology necessary to support changes in technologies. These investments along with industry demand provide the ECHT program at ECC a unique opportunity to enable students to acquire the skills necessary to address both; a shrinking pool of qualified electronic technicians to support local industry in their workforce pre-retirement, and a source for either technical skill upgrades for students/employees seeking upward mobility in their current of future job. Student

learning outcomes are an integral part of each course and helps transform the program direction toward greater efficiency. Sustainable continuous quality improvements!

e) Describe how you have improved your SLO process and engaged in dialogue about assessment results

Faculty, students, and advisory committee members are in open dialog regarding student needs for career success. Over the last year, the ECHT program has added 1 new certificate and 2 new courses. The program moved into a new facility, spring 2015.

f) List any related recommendations.

1) One aspect that has been considered, in or ongoing process improvement, integrating assessment tools in all courses as a normally graded assignment. By doing this, we can get real time results of what or what does not work concerning student success.

2) Revising SLO's that no longer pertain to a goal or standard

5. Analysis of Student Feedback

Provide a copy of any feedback reports generated by Institutional Research and Planning. Review and discuss student feedback collected during the past four years including any surveys, focus groups,

Electronics & Computer Technology Student Survey

N = 128 Spring 2015

1. Instructors in the ECHT program have helped me explore various vocational and academic options.

Response	Frequency	Percent
5	70	54.26
4	38	29.46
3	15	11.63
2	2	1.55
1	0	0.00
Missing	4	3.10

2. I can depend on instructors in the ECHT program to help me stay focused.

Response	Frequency	Percent
5	84	65.12
4	36	27.91
3	6	4.65
2	0	0.00
1	0	0.00
Missing	3	2.33

3. Instructors in the ECHT program provide opportunities to actively participate in my classes .

Response	Frequency	Percent
5	95	73.64
4	26	20.16
3	5	3.88
2	0	0.00
1	1	0.78
Missing	2	1.55

4. I feel that the ECHT instructors truly want me to succeed.

Response	Frequency	Percent
5	100	77.52
4	23	17.83
3	3	2.33
2	0	0.00
1	0	0.00
Missing	3	2.33

5. Student contributions have been valued by instructors in this program.

Response	Frequency	Percent
5	86	66.67
4	28	21.71
3	9	6.98
2	0	0.00
1	1	0.78
Missing	5	3.88

6. I have felt a sense of community within this program.

Response	Frequency	Percent
5	80	62.02
4	33	25.58
3	10	7.75
2	0	0.00
1	3	2.33
Missing	3	2.33

1. I feel the curriculum provides me with a solid foundation in electronic technology.

Response	Frequency	Percent
5	81	62.79
4	38	29.46
3	4	3.10
2	1	0.78
1	1	0.78
Missing	4	3.10

2. Courses were scheduled on days and times that were convenient to me.

Response	Frequency	Percent
5	71	55.04
4	37	28.68
3	8	6.20
2	4	3.10
1	6	4.65
Missing	3	2.33

3.I╞╪ve been able to register for the classes I need within this program.

Response	Frequency	Percent
5	68	52.71
4	38	29.46
3	16	12.40
2	4	3.10
1	1	0.78
Missing	2	1.55

4. The courses in this program have helped me meet I ╞╪ve set for myself.

Response	Frequency	Percent
5	66	51.16
4	42	32.56
3	9	6.98
2	0	0.00
1	2	1.55
Missing	10	7.75

5. The courses in the ECHT program incorporate skil l sets that I╞╪ll expect to use at work.

Response	Frequency	Percent
5	68	52.71
4	42	32.56
3	6	4.65
2	1	0.78
1	0	0.00
Missing	12	9.30

6. The course materials covered in each ECHT course meets or exceeds the SLO statement on the course syllabus.

Response	Frequency	Percent
5	71	55.04
4	35	27.13
3	4	3.10
2	0	0.00
1	0	0.00
Missing	19	14.73

7. The library has the resources to help me succeed in this program.

Response	Frequency	Percent
5	29	22.48
4	28	21.71
3	31	24.03
2	7	5.43
1	11	8.53
Missing	23	17.83

There is a variety of extracurricular activities related to this program on campus.

Response	Frequency	Percent
5	26	20.16
4	24	18.60
3	34	26.36
2	7	5.43
1	4	3.10
Missing	34	26.36

1. The buildings and classrooms used by this progra m are satisfactory.

Response	Frequency	Percent
5	40	31.01
4	28	21.71
3	18	13.95
2	17	13.18
1	19	14.73
Missing	7	5.43

2. I am satisfied with the equipment [projectors- machinery- models- etc.] used in this program.

Response	Frequency	Percent
5	45	34.88
4	33	25.58
3	16	12.40
2	16	12.40
1	14	10.85
Missing	5	3.88

3. I am satisfied with the computers and software u sed in this program.

Response	Frequency	Percent
5	37	28.68
4	42	32.56
3	18	13.95
2	15	11.63
1	10	7.75
Missing	7	5.43

Throughout the time I ╞╪ve been attending various ECHT courses- I ╞╪m aware of what I should be able to learn and what skills I should possess after completing courses in the program.

Response	Frequency	Percent
5	71	55.04
4	41	31.78
3	10	7.75
2	2	1.55
1	0	0.00
Missing	5	3.88

i. Data indicates that a majority of the students polled felt that ECHT faculty helped them explore various vocational and academic options, as well, helped them stay as part of a learning community focused. A majority also indicated that ECHT faculty truly wants students to succeed and participate in class.

ii. Curriculum (**Questions7-14)**

Student data indicates that the ECHT Program provides students with a solid foundation in electronics and that most class scheduling times meets their needs

iii. Facilities, Equipment, and Technology (**Questions 8-13)**

Students showed some concerns with both facilities and equipment used in current use

The students surveyed seemed satisfied with both the software and instructional technology used in the classrooms.

iv. Program Objectives (**Question 15)**

Most students indicated they knew, or were aware of the exit skill sets housed in every ECHT course they have taken here at ECC

b) Discuss the implications of the survey results for the program.

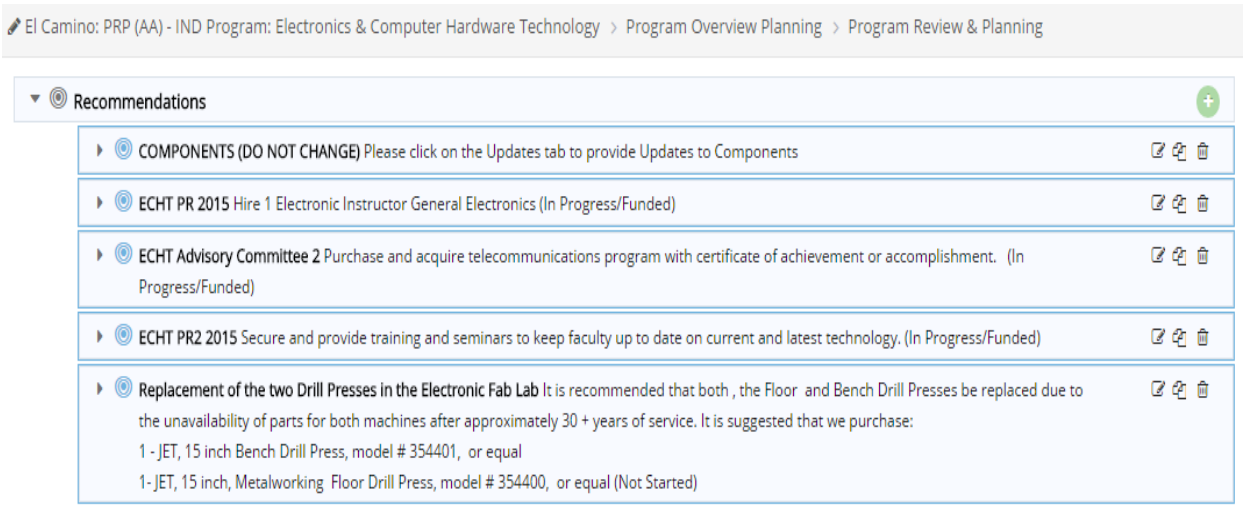
The resulting data indicates that students feel the curriculum meets their needs for both Career Technical l Preparation, as well skill upgrades.

c) Discuss the results of other relevant surveys.

By the results indicated, most seem to feel that program is meeting their expectations.

d) List any related recommendations.

As technology changes the college should be ready to invest in faculty and equipment, so the ECHT Program can provide a high quality return to the community service area. We have repeatedly asked for support through “PRP”, Program Review and Planning.



1. Hire a replacement Electronics instructor (funded 2015-16).
2. Provide $100, 000, one time allocation to upgrade the equipment in the Computer Repair area of the program, (in progress, but not funded).
3. The college provides funds, $5,000/yr, for faculty and staff to attend conferences to stay relevant in our technology.

6. Facilities and Equipment

As of spring 2015, we moved into a new facility, with new challenges. The classrooms we were given are in many aspects are inadequate. Because of the space limitations in the new ITEC Building, we were given “classrooms” not “classroom laboratories”. The classrooms are approximately 940 square feet, versus a state approved, Industrial Technology classroom/laboratory with 1042 minimum square feet. The college used a formula for classroom results in:

1) Students having difficulties in performing labs.

2) No area for faculty demonstration.

3) Reduced instructional effectiveness because of reconfiguration of classroom areas (Electronic fabrication and Computer classrooms).

4) We have a Communications classroom with **“no means”** to teach radio communications because of construction limitations that were changed during the remodel.

5) Because of the classroom configuration, students have an equally difficulty in seeing instructional demonstrations on “whiteboards” and “make-shift-faculty-demonstration-benches”.

6) Many of our classroom computers have little to no access to the college network

(All of our currently used software is drawn from the college servers. No access and very little instruction.)

7) We have classroom printers that cannot be used. (We're in the second semester in the new facility. Students still do not have direct access to the classroom printers. Instructors have used temporary patches, cables to work around this problem.)

8) Faculty work stations are not reliable for instruction because of "glitches"

9) Had to modify the machine room in ITEC 208, because of changes that were made without consultation of primary faculty

10) The classroom cabinets are too low making it for student to us eye washes difficult.

11) The new cabinet's doors are falling off from their hinges. This is a safety hazard.

12) It was requested in the design of our new classroom that "isolation transformers" be installed on each student lab bench. That didn't happen.

13) The "overhead" cabinets in all electronics classrooms are too low. Students have problems using eye washes and cleaning under the present configuration

b) Explain the immediate (1-2 years) needs related to facilities and equipment. Provide a cost estimate for each need and explain how it will help the program better meet its goals. See above

c) Explain the long-range (2-4+ years) needs related to facilities and equipment. Provide a cost estimate for each need and explain how it will help the program better meet its goals.

d) List any related recommendations.

1) Provide for at least one full size classroom/laboratory for lab and demonstrations. A demonstration are would provide better student understanding and success ($100,000)

2) Raise the "overhead" cabinets in all electronics classrooms. Students have problems using eye washes and cleaning under the present configuration (5,000)

7. Technology and Software

In the past, software that is needed for instruction, that has since expired with no indication we were kept in the dark when the new subscription will be installed. ITS, Instructional Technology Services used to be responsible for the purchase and maintenance of software licenses. The cost of such software was paid by ITS. As of this Program Review date, this instructor has no idea of the cost the district pays for licensed software.

b) Explain the immediate (1-2 years) needs related to technology and software. Provide a cost estimate for each need and explain how it will help the program better meet its goals.

The Computer Electronics portion of the ECHT Program, in many cases, uses "recycled" components that are at least three to five years old. We need to have an infusion of support so that we can provide our student cutting-edge skills. To achieve this goal, the college needs to increase the ECHT Supply budget by at least $10,000/year to purchase equipment test devices, and software to support this program adequately

c) Explain the long-range (2-4+ years) needs related to technology and software. Provide a cost estimate for each need and explain how it will help the program better meet its goals.

It was recommended by our Advisory Committee, that we should look into starting a Telecommunications Program. We cannot do this unless we have a new stream of support. We have asked for $100,000, in 2012 money, for seed money to design and support this new technology.

Recommendations:

1. Purchase Telecommunications and dedicated Electronic Test Equipment (Lab Volt for class of 24 students)

    a) 12 -FACET® System Base Units
    b) 12- FACET® ANALOG COMMUNICATIONS MODEL 91018
    c) 12- FACET® DIGITAL COMMUNICATIONS 1 MODEL 91022
    d) 12-FACET® DIGITAL COMMUNICATIONS 2 MODEL 91023
    e) 12-FACET® FIBER OPTIC COMMUNICATIONS MODEL 91025
    f) 12-FACET® DIGITAL SIGNAL PROCESSOR MODEL 91027
    g) 12-FACET® Transmission Lines MODEL 91028
    h) 12-FACET® QPSK/OQPSK/DPSK MODEL 91029
    i) 12-VIRTUAL INSTRUMENT PACKAGE MODEL 1250
    j) 12-COMMUNICATIONS TECHNOLOGIES TRAINING SYSTEM MODEL 8087
    k) A standalone server to support the Telecommunications program

8. Staffing

a) Describe the program's current staffing, including faculty, administration, and classified staff.

Currently, we have two academic administrators, and one classified Supervisor assigned to the ECHT Program. There are currently, two full time faculty members with one adjunct covering a load for 3 FTEF. Since our last program review, we have lost a full-time faculty member due to retirement. This has had a definite impact on both the number of section we are able to offer

We have two classified employees: one full-time electronic technician, and a one-half time tool room attendant, assigned to our program. Within the next year, the electronic technician plans to retire.

Because we may not be able offer and assess each ECHT course in timely fashion because of a lack of staffing. The ECHT program needs to move to a more sustainable level staffing due to pre retirements and a full-time faculty retirement

b) Explain and justify the program's staffing needs in the immediate (1-2 years) and long-term (2-4+ years). Provide cost estimates and explain how the position/s will help the program better meet its goals.

The district should make its intentions clear. The division dean is aware that in the next three years, because of the early retirement program, we'll lose one of the two full-time faculty assigned to the program. Also, it is known that the remaining instructor is looking for possible advancement. It is not unthinkable that this department may not have faculty to teach its courses. This problem is known. The program may be in jeopardy of closure, not because the lack in qualified instructor, but because of the districts stalwart position in not replacing instructors that retire or leave.

The same situation is present in the support staff. Because of scheduling, courses suffer. If the department electronics technician retires, Spring 2016, as he plans to do, we'll have a further impact on courses delivered in the program.

The cost for the retired full-time faculty member, as well the salary for the retiring electronics technician is embedded already in the budget. In other word, their replacement would be "fiscally neutral".

Since our last Program review, 2010-11 we have utilized for our student success, an "electronic tutor" provided by the resource center. Over the past three years, the tutors hours have been cut from 24 hours per week to only 8.

c) List any related recommendations.

1) Hire at least one, new, full-time electronic instructor with a "Generalist" background

2) Prepare to replace the retiring full-time electronic technician. Hire the replacement now so that the new technician can be able to become familiar with department's equipment and operating protocols.

3) Develop a "pool" of qualified part-time faculty with very specific specialties

4) The district should hire more "Tech Arts "tutors with hour for days/nights and some weekend to provide student and instructional support.

9. Future Direction and Vision for implementing relevant technologies

a) Describe relevant changes within the academic field/industry. How will these changes impact the program in the next four years?

The electronic manufacturing/service industry has experienced a great many changes over the years; however the current rate exceeds that of any other time in industry history. This accelerated rate of change is the result of several factors, the most noted of which is industries start to "retool" after the Great Recession, global technological changes, small "start-ups" that have a need for skilled electronic technicians, and the number of "allied fields" demanding their employees to be technically diversified

Industry, political, and public demand is changing the skill requirements for electronic technicians. These skills needs have expanded to include the need for vast amounts of technology-based skills including system analysis, system automation, and system integration. Advancements in technology and new technician skill sets either provided or enhanced by the ECHT Program, can provide viable solutions both in the short and long term, for this industry

b) Explain the direction and vision of the program and how you plan to achieve it.

The emphasis of the ECHT program at ECC is obviously on technology as a tool to student success however, the core program focus is on student leadership in energy efficiency and the reduction in human impact on global climate change. Student personal and professional leadership is a goal that extends from the program to the students future. Career skills are not sufficient for a meaningful and successful career. With these goals as the program driver, the program direction is to incorporate many overlapping SLO's in every course and the properties of leadership within student assignments. The focus on a solid foundation in electronics, as well: digital systems, system integration, and, system automation, provides. This focus satisfies student hunger for financial success however, does not address student individual long-term success this requires leadership. The vision of the ECHT program is on nourishing the whole student for a successful career and life filled with passion and a sense of fulfillment. We have an obligation that transcends our program or course learning objectives.

In the next few years the vision is to include at least one new electronics instructor being hired to help guide this department into the second decade of the this new century. We will add continuing education (lifelong learning) opportunities for technician and engineer development. We will collaborate with contractors and manufacturers to create technicians continuing education opportunities.

c) List any related recommendations.

There are few things as important as the whole human in education? As much as I would like to forward the ECHT program sometimes, we forget the nature of our mission. Our mission is not program or professional success; our mission is our students. To do this, my recommendation is for us to take a look at the **"total student**". Through student surveys, which I've been using in all of my classes, we can see where our students came from, what their current goals are, and where they would like to do once they finish the program. This historic prospective lets us track the personal growth of our students.

Single and prioritized list of recommendations

Priority	Recommendations	Cost Estimate	Strategic Initiatives
1	Hire one new , replacement electronics Instructor	$100,000	A,B,C,E,F
2	Build a "cutting Edge" Telecommunications Lab	$100,000(per year for three years)	A,B,C,E,F
3	Faculty "in-service "	$50000x each instructor	A,B,C,D

10. Prioritized Recommendations

1) Hiring a new faculty member is so important; we gave this item our top priority. In the next two and a half years, the ECHT department will possibly not have a full-time faculty member responsible for the program. Because of the service area we serve, it is vital that we do not put this program in future situational urgency, that we may not have both resources and application pools to attract qualified candidates. By hiring this replacement position, we'll insure program continuity.

2) Our Advisory Committee has told us on numerous occasions that a Telecommunication, wired and wireless, Program would be very important to the ECC service area. Right now, students only have access to this type of training from "for pay" schools and possibly military training. We can provide this training at a lower cost to student and community.

3) Faculty "In-service": Faculty are invited, periodically, to attend workshops that may enhance their technical and possibly their teaching skills the problem, Staff development doesn't have the resources to provide for all instructors the "focused" staff development they may need.

Recommendations

Hire one new, replacement Electronics Instructor

Because we may not be able offer and assess each ECHT course in timely fashion because of a lack of staffing. The ECHT program needs to move to a more sustainable level staffing due to pre retirements and future full-time faculty retirements

Cost Estimate $80,000 + Benefits

Strategic Initiatives A,B,C,E,F

No Dissent

CAREER AND TECHNICAL EDUCATION – SUPPLEMENTAL QUESTIONS

CTE programs must conduct a full program review every 4 years. The full review includes answering these supplemental questions. Every two years (once between full reviews) these supplemental questions must be answered and submitted to Academic Affairs for posting on the College website.

Use labor market data, advisory committee input, institutional data, and the provided CTE 2-year Program Review data to respond to the following questions

(See Appendix B, Labor Market Indicators)

> How strong is the occupational demand for the program? As you analyze demand over the past 5 years and projected demand for next 5 years, address state and local needs for the program. (See Appendix B)

1. Computer & Electronic Product Manufacturing
2. Electronic Instrument Manufacturing

3. Electrical Equipment & Appliance Manufacturing
4. Electrical & Electronic Goods Merchandise Wholesalers
5. Aerospace Product & Parts Manufacturing

***Los Angeles Long Beach Glendale MD (Los Angeles County)** Industry Employment & Labor Force - by Annual Average, March 2015 Benchmark

2. How does the program address needs that are not met by similar programs in the region?

The Electronic and Computer Hardware Technology Program, at El Camino, is the only full service program in the area, west of the 57 Freeway. Because of this situation, we have students enroll in our ECHT courses, whose home districts are in: Santa Monica, LACC, Cerritos, Long Beach City, North Orange County Community College District, and as far as Rio Hondo College.

We have seen over the past years, students enrolling in our program from "For-pay" schools such as Devry and ITT. Many of these students arrive with a lot of debt, and many couldn't complete their program of study in electronics. Although we cannot give them equivalent credit for the prior courses, we do what we can to help them become successful.

At $47/unit, we're still a great "return -on –investment" for a student to get a high level, recognized transferrable program at a very reasonable cost.

3. What are the completion, success, and employment rates for the students? Discuss any factors that may impact completion, success, and employment rates. If applicable, what is the program doing to improve these rates?

We need to work on or completion rates! But, because of the nature of the beast, the ECHT Program being a technical training area, completion and success are subjective. I survey my students to find out why they are here? I get responses: Get a degree, Skills upgrade, transfer, exploring options, or obtaining skills for work preparation. A student may feel that he/she is highly successful by completing one of the above options without completing a degree or a certificate. But by Institutional Research criteria, they are labeled as class/program non-completer. There is a term in law, "Prima Foci", (first look)—the system must reorient itself to become "**student oriented" not "numbers oriented**".

A snap shot addressing completion, success, and retention rates was our involvement in the Career Academy's, Northrop Grumman corp., J-Standard training program. Thirteen current ECHT students completed the program, and ten were offered employment either as a contractor or full time permanent employee for NGC. Their salary will be a "Life Wage".

As to improving our success rates, we try to provide outside classroom experiences, such as the Robotic and Women in Technology Clubs, to help in "peer support ". We have found that those students who participate in organizations I've mentioned tend to have on average, Success and Retention.

4. If there is a licensure exam for students to work in their field of study, please list the exam and the pass rate. If there are multiple licensure exams in the program, include them all. Discuss any factors that may impact licensure exam pass rates. If applicable, what is the program doing to improve these rates?

In the computer repair option, many students take the COMPTIA Certification exams for A+, Net+, and Security+.
For those students who take the independently administrated exam, Pass Rates are:
1. A+ ≥ 90%
2. Net+ ≥ 65%
3. Security+ ≥ 65%

One factor on the success rates, the "lag" between the student's classroom exposure and the actual testing. This problem arises because of the cost for the various examinations. If the examination were to be offered on campus, **at a student lower cost**, the success rates should go up!

5. Is the advisory committee satisfied with the level of preparation of program graduates? How has advisory committee input been used in the past two years to ensure employer needs are met by the program? Describe any advisory committee recommendations that the program is either unable to implement or is in the process of implementing.

Electronics and Computer Hardware Technology Advisory Meeting

Minutes

April 22, 2015

Industry Reps: Greg Owens (Space X), Jane Templin (GTI), Ananda Arachchige, Phone Interview (LACMTA), Tia Pham (Northrop Grumman), Kevin Minkes (ECC , ECHT Student)

ECC Staff: Steve Cocca, Bob Diaz, and John Ruggirello

Introductions:

Greg Owens, Senior Technical Trainer for Avionics and Cable Assembly Manufacturing has worked for Space X for 9 years. He has vast military and industrial experience in Manufacturing.

Jane Templin, Vice President for GTI, a training institute that provides Apprentices and Journey Level workers with skills ranging from low to high level electrical installation and repair, as well supporting the entertainment industry. Jane herself, is a Journey Level Electrician with over 29 years of experience.

Tia Pham is a Senior Electrical Designer working for Northrop Grumman, in Redondo Beach. His job duties include developing designs for cable assemblies that could be used in both military and commercial aircraft, as well in various types of space vehicles. He has over 10 years of experience working in the industry.

Ananda Arachchige is a "Lead" for LACMTA, Los Angeles County Metropolitan Transit Authority. His duties include the support of all electronics, communications, and data equipment used in LACMTA vehicles. Although Mr.Arachchige could not attend the meeting, a phone interview has held to gather his input. He has over 20 years of experience in the electronic communication area in both industrial and military.

Kevin Minkes is a current student taking ECHT courses and plans to pursue a job in either Automated Controls or Robotics.

Discussion:

A rough copy of the ECHT, Electronic and Computer Hardware Technology, Program Review was shared with the group. Discussion was made about the direction of the program regarding: class offerings, student completers and retention, and size and type of degrees and certificates.

Greg Owens saw, getting through the program that it took a very long time. But he cited the current content of the program, as established, meets many of his job requirements in his organization, Space X. He said" Because many of technicians a interfacing with engineers, they need to have the ability to talk-the-talk" and follow some highly technical instructions." "No longer can we just give a technician an assembly without them having, in some cases, a high understanding on how it works. He believes the community colleges; especially El Camino's ECHT Program prepares prospective employees for these technical challenges. Mr. Owen believes that we should direct our students to go for the AS Degree because employees need to bring to their job skills to address employer and in some instances customer needs and advancement.

Jane Templin also observed getting through the program that it took a very long time. But, she too saw the value in the current program as constituted in degree and certificates. She said, "The job responsibilities for an electrician are changing continuously." We're seeing more Journey Level, as well, Apprentices being confronted by ever increasing sophisticated technical challenges." "My people are working in areas from waste water treatment to some very sophisticated environment al system such as "Micro Grid" used to control energy use in large offices, hotels, and hospitals." She concurred that her people need to know how a system works before they can fix it. She also believed that we should direct our students to go for the AS Degree because employees need to bring to their job skills to address employer and in some instances customer needs.

Tia Pham also observed getting through the program that it took a very long time. But, he too saw the value in the current program as constituted in degree and certificates. Designers need to know electrical parameter of a particular circuit, assembly, and assembly. By understanding what and how a circuit performs a particular job, our design work will be more cost effective and add to the "safety and success" of a project and mission. He also believed that we should direct our students to go for the AS

Degree because employees need to bring to their job skills to address employer and in some instances customer needs.

Ananda Arachchige He too saw the value in the current program as constituted in degree and certificates. He made a recommendation that in the future, we may look at offering courses that could lead to a FCC General Class License, as well Special Endorsements, and Renewals

Kevin Minkes shared his experience in the value of the ECHT Program. "I've been looking around at various schools to find a program that would fit my interests."' I'm happy with the courses I've taken and plan to take more" "The instructors I've encountered bring the class many years of experience." His recommendation which was chimed in by all in attendance, Hire a new Full-time faculty member so courses could be offered more frequently so student will be able to complete the AS Degree and Certificates in a timely fashion

Recommendations:

1) Leave the program the program as is. Integrate more trouble shooting and circuit fault problem solving in our labs
2) offering courses that could lead to a FCC General Class License, as well Special Endorsements, and Renewals
3) Hire a new Full-time faculty member so courses could be offered more frequently so student will be able to complete the AS Degree and Certificates in a timely fashion

APPENDIX A

COLLEGE MISSION AND STRATEGIC INITIATIVES

El Camino College offers quality, comprehensive educational programs and services to ensure the educational success of students from our diverse community.

EL CAMINO COLLEGE is committed to being an open access institution and serving students of all ages, cultures and backgrounds.

Our exemplary faculty and professional staff recognize that individual, community and global needs are diverse and changing. In response to these needs the college offers comprehensive educational opportunities for:

Achievement of Associate Degrees in Arts and Sciences

Transfer to baccalaureate institutions

Mastery of basic skills such as critical thinking, mathematics, written and oral communication

Cultural enrichment and lifelong learning

Acquisition of the necessary career education and skills to successfully participate in the workplace and global economy

Development of the economy and jobs in the region and state

See attached Labor Market Indicators in Appendix

To assure the quality of these educational opportunities, the College is dedicated to implementing its stated strategic initiatives:

STRATEGIC INITIATIVES for 2015-2020

A. STUDENT LEARNING

Support student learning using a variety of effective instructional methods, educational technologies, and college resources.

B. STUDENT SUCCESS & SUPPORT

Strengthen quality educational and support services to promote and empower student learning, success, and self-advocacy.

C. COLLABORATION

Advance an effective process of collaboration and collegial consultation conducted with integrity and **respect.**

D. COMMUNITY RESPONSIVENESS

Develop and enhance partnerships with schools, colleges, universities, businesses, and community-based organizations to respond to the educational, workforce training, and economic development needs of the community.

E. INSTITUTIONAL EFFECTIVENESS

Strengthen processes, programs, and services through the effective and efficient use of assessment, program review, planning, and resource allocation.

F. MODERNIZATION

Modernize infrastructure and technological resources to facilitate a positive learning and working environment.

ECHT MISSION STATEMENT:

The mission of El Camino College is to offer quality, comprehensive educational programs and services to ensure the educational success of students from its diverse community. Success as defined by the Electronics and Computer Hardware Technology Program is acquiring the skills necessary to acquire and sustain a successful career in the ever changing industry. Over the last year the ECHT program has evolved, by adding three new courses and two new certificates, and has updated the entire course SLO's and is currently updating each of the course offerings to meet student and industry demands. The electronics industry is according to the Department of Labor still a modest growth in electronics careers in the locally. The demand for qualified people is growing beyond the current ability to fill these positions. The ECHT program is focused on three knowledge areas: basic electronic skill development, Skill upgrades, and introduction to new emerging technologies. Two key employment forces that drive the modern U.S. economy are: advanced manufacturing technologies and an electronic literate workforce to support it. These two forces are linked directly to the ECC's ECHT program student learning outcomes. This is why the ECHT program is directing resources to develop skills within each student that can be directly applied to answering these fundamental industry needs. Students turned technicians will have the basic skills necessary to meet the changing needs of most electronic industries and secure long term successful careers making a "life wage

APPENDIX B:

Student Survey

Electronics and Computer Hardware Technology, Student Survey 2015

Facilities, Equipment, & Technology					
The buildings and classrooms used by this program are satisfactory.	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
I am satisfied with the equipment (projectors, machinery, models, etc.) used in this program.	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
I am satisfied with the computers and software used in this program.	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Program Objectives					
Throughout the time I've been attending various ECHT courses, I'm aware of what I should be able to learn and what skills I should possess after completing courses in the program.	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree

Curriculum					
I feel the curriculum provides me with a solid foundation in electronic technology	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Courses were scheduled on days and times that were convenient to me.	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
I've been able to register for the classes I need within this program.	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
The courses in this program have helped me meet the goals I've set for myself.	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
The courses in the ECHT program incorporate "skill sets" that I'll expect to use at work	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
The course materials covered in each ECHT course meets or exceeds the "SLO" statement on the course syllabus	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree

Student Support					
Instructors in the ECHT program have helped me explore various vocational and academic options	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
I can depend on instructors in the ECHT program helping me stay focused	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Instructors in the ECHT program provide opportunities to actively participate in my classes.	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
I feel that the ECHT instructors truly want me to succeed.	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Student contributions have been valued by instructors in this program.	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree

1Labor Market Indicators “LMI”, Allied Electronic Occupations

Employment Development Department
Labor Market Information Division
Published: December 2014

2012-2022 Occupational Employment Projections
Los Angeles-Long Beach-Glendale Metropolitan Division
(Los Angeles County)

SOC Code*	Occupational Title	Estimated Employment 2012**	Projected Employment 2022	Numeric Change 2012-2022 [1]	Percent Change 2012-2022	Annual Average Percent Change	Average Annual Job Openings			2014 First Quarter Wages [5]		Education and Tra Levels [7]	
							New Jobs [2]	Replace-ment Needs [3]	Total Jobs [4]	Median Hourly	Median Annual	Entry Level Education	Work Experience
00-0000	Total, All Occupations	4,322,900	4,876,600	553,700	12.8%	1.3%	59,213	98,732	157,945	$18.36	$38,194		
15-0000	**Computer and Mathematical Occupations**	**97,830**	**115,180**	**17,350**	**17.7%**	**1.8%**	**1,735**	**1,573**	**3,308**	**$41.49**	**$86,299**		
15-1100	Computer Occupations	95,230	111,930	16,700	17.5%	1.8%	1,670	1,507	3,177	N/A	N/A		
15-1121	Computer Systems Analysts	12,100	14,810	2,710	22.4%	2.2%	270	190	460	$43.96	$91,439	3	None
15-1122	Information Security Analysts	2,170	2,170	0	0.0%	0.0%	0	34	34	$46.57	$96,872	3	<5 years
15-1142	Network and Computer Systems Administrators	9,880	10,770	890	9.0%	0.9%	90	155	245	$38.24	$79,541	3	None
15-1143	Computer Network Architects	4,340	5,350	1,010	23.3%	2.3%	100	68	168	$41.74	$86,815	3	≥5 years
15-1151	Computer User Support Specialists	14,450	17,540	3,090	21.4%	2.1%	309	227	536	$24.74	$51,466	6	None
15-1152	Computer Network Support Specialists	3,580	3,680	100	2.8%	0.3%	10	56	66	$33.55	$69,778	4	None
15-1199	Computer Occupations, All Other	3,270	3,680	410	12.5%	1.3%	42	51	93	$37.77	$78,560	3	None
17-0000	**Architecture and Engineering Occupations**	**69,080**	**72,660**	**3,580**	**5.2%**	**0.5%**	**419**	**1,610**	**2,029**	**$42.81**	**$89,041**		
17-2031	Biomedical Engineers	590	730	140	23.7%	2.4%	14	15	29	$44.26	$92,066	3	None
17-2071	Electrical Engineers	4,740	4,710	-30	-0.6%	-0.1%	0	104	104	$53.10	$110,449	3	None
17-2072	Electronics Engineers, Except Computer	7,380	7,550	170	2.3%	0.2%	17	161	178	$48.80	$101,505	3	None
17-2081	Environmental Engineers	1,500	1,880	380	25.3%	2.5%	38	37	75	$49.78	$103,529	3	None
17-3012	Electrical and Electronics Drafters	1,500	1,750	250	16.7%	1.7%	26	20	46	$26.09	$54,258	4	None
17-3022	Civil Engineering Technicians	1,240	1,220	-20	-1.6%	-0.2%	0	26	26	$30.97	$64,416	4	None
17-3023	Electrical and Electronics Engineering Technicians	3,510	3,430	-80	-2.3%	-0.2%	0	73	73	$30.03	$62,463	4	None
17-3024	Electro-Mechanical Technicians	380	340	-40	-10.5%	-1.1%	0	8	8	$22.80	$47,429	4	None
17-3026	Industrial Engineering Technicians	1,270	1,230	-40	-3.1%	-0.3%	0	26	26	$28.75	$59,802	4	None
17-3027	Mechanical Engineering Technicians	1,090	1,040	-50	-4.6%	-0.5%	0	22	22	$27.95	$58,153	4	None
17-3029	Engineering Technicians, Except Drafters, All Other	1,770	1,860	90	5.1%	0.5%	8	37	45	$31.37	$65,256	4	None
27-4011	Audio and Video Equipment Technicians	5,190	5,840	650	12.5%	1.3%	66	94	160	$24.10	$50,130	5	None
27-4014	Sound Engineering Technicians	3,080	3,150	70	2.3%	0.2%	7	56	63	$35.53	$73,916	5	None
47-2111	Electricians	11,100	13,390	2,290	20.6%	2.1%	229	209	438	$30.44	$63,307	7	None
49-0000	**Installation, Maintenance, and Repair Occupations**	**118,010**	**135,350**	**17,340**	**14.7%**	**1.5%**	**1,759**	**2,693**	**4,452**	**$22.49**	**$46,788**		
49-1000	Supervisors of Installation, Maintenance, and Repair Workers	9,610	10,770	1,160	12.1%	1.2%	116	260	376	N/A	N/A		

Employment Development Department
Labor Market Information Division
Published: December 2014

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Los Angeles-Long Beach-Glendale Metropolitan Division
(Los Angeles County)

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							New Jobs [2]	Replace-ment Needs [3]	Total Jobs [4]	Median Hourly	Median Annual	Entry Level Education	Work Experience
49-1011	First-Line Supervisors of Mechanics, Installers, and Repairers	9,610	10,770	1,160	12.1%	1.2%	116	260	376	$35.27	$73,363	7	<5 years
49-2000	Electrical and Electronic Equipment Mechanics, Installers, and Repairers	15,560	18,510	2,950	19.0%	1.9%	301	272	573	N/A	N/A		
49-2011	Computer, Automated Teller, and Office Machine Repairers	2,790	2,770	-20	-0.7%	-0.1%	0	58	58	$19.35	$40,234	6	None
49-2021	Radio, Cellular, and Tower Equipment Installers and Repairs	380	380	0	0.0%	0.0%	0	5	5	$27.35	$56,885	4	None
49-2022	Telecommunications Equipment Installers and Repairers, Except Line Installers	6,830	9,180	2,350	34.4%	3.4%	235	94	329	$28.22	$58,696	5	None
49-2091	Avionics Technicians	590	620	30	5.1%	0.5%	3	12	15	$29.08	$60,488	4	None
49-2092	Electric Motor, Power Tool, and Related Repairers	450	440	-10	-2.2%	-0.2%	0	8	8	$20.50	$42,636	5	None
49-2093	Electrical and Electronics Installers and Repairers, Transportation Equipment	390	400	10	2.6%	0.3%	1	8	9	$34.85	$72,487	5	None
49-2094	Electrical and Electronics Repairers, Commercial and Industrial Equipment	720	710	-10	-1.4%	-0.1%	0	14	14	$24.97	$51,928	5	None
49-2095	Electrical and Electronics Repairers, Powerhouse, Substation, and Relay	370	400	30	8.1%	0.8%	3	8	11	$43.67	$90,838	5	None
49-2096	Electronic Equipment Installers and Repairers, Motor Vehicles	290	270	-20	-6.9%	-0.7%	0	3	3	$16.89	$35,114	5	None
49-2097	Electronic Home Entertainment Equipment Installers and Repairers	460	580	120	26.1%	2.6%	12	16	28	$17.33	$36,050	5	None
49-2098	Security and Fire Alarm Systems Installers	2,290	2,750	460	20.1%	2.0%	46	47	93	$22.63	$47,063	7	None
49-3091	Bicycle Repairers	230	280	50	21.7%	2.2%	5	8	13	$11.09	$23,084	7	None
49-3093	Tire Repairers and Changers	1,470	1,770	300	20.4%	2.0%	30	51	81	$14.56	$30,290	7	None
49-9000	Other Installation, Maintenance, and Repair Occupations	59,210	67,650	8,440	14.3%	1.4%	864	1,320	2,184	N/A	N/A		
49-9012	Control and Valve Installers and Repairers, Except Mechanical Door	990	1,070	80	8.1%	0.8%	8	33	41	$33.20	$69,068	7	None
49-9051	Electrical Power-Line Installers and Repairers	1,290	1,490	200	15.5%	1.6%	21	44	65	$49.98	$103,958	7	None