HAWAI`I COMMUNITY COLLEGE
ANNUAL INSTRUCTIONAL
PROGRAM REVIEW

Electronics Technology

APRIL 2, 2007

Harvey Motomura

ANNUAL INSTRUCTIONAL PROGRAM REVIEW
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I.   Narrative and Analysis of Data
a. Statement on the mission or purpose of the program, including the target student population;

        The Electronics Technology (ET) program prepares individuals to fabricate, install, test, troubleshoot, repair and maintain electronic components, equipment and systems. Students advance from basic electrical and electronic courses to specialized studies of microcomputer systems and telecommunications.

        Entry requirements are placement into Math 22 and placement into Eng 20R or ESL 9. Students placing below these levels are encouraged to take the Math and English prerequisite courses and upon completion of Math 22 and Eng 20R or ESL 9 are accepted into the program.

b. Information on external factors affecting the program;

        Local employers have requested students be trained in photonics and fiber optics. The program's sole instructor is upgrading his skills to be able to teach these classes.

c. Attach PHI Report (CTE Programs only) See attached.

d. Required external measures, if applicable (e.g.) Nursing Cert.

        Graduates normally attain the Federal Communications Commission General Radiotelephone Operators License (GROL). This is a recommended (not required) licensure upon graduation.

e. Data analysis

The program is cautionary. Data elements in the areas of unduplicated majors and average class size and fit are low in comparison to averages for the ATE division. The program ran a major percentage of its classes with less than 10 students.

<u>Number of majors:</u> The program has 39 unduplicated majors for the academic year and 23.6 FTE student majors based on student semester hours. FTE student majors as a percentage of unduplicated majors appears reasonable (61%) compared to other programs in the same department. The program had 13 graduates – the largest of any of the ATE division programs.

<u>Average class fit & student-faculty ratio:</u> ET classes are capped at 20 compared to an average of 18 for the division. The program average class fit was 51% for the year and the average class size was 10.2. A large percentage of classes during the reporting period are classified as small, less than 10 students. The student-faculty ratio was 6.43 which appears reasonable compared to average class size.

FTE faculty: The BOR appointed program faculty of 1 is not adequate based on the 2.29 calculated FTE faculty required using 21 contact hours for the academic year. The program has traditionally had 2 FTE faculty; the number dropped January 2005 with the resignation of an instructor. Recruitment efforts in 2005 and 2006 were unsuccessful.

GPA and Number of Graduates: The program paid course (PPC) average GPA is 2.83 and the non-PPC average GPA is 2.77. The ET program graduated 13 students. These statistics are average based on comparable data for the 9 programs in the ATE division and 5 programs in the Transportation and Applied Technology department.

II. Update or Create Your Action Plan including Budget Request with Justification, if needed.

Plan of Action 2006-2007

1. Course upgrades and additions will be submitted to the curriculum committee fall 2008. As part of this process, curriculum will be aligned with Maui CC and Kauai CC.
2. The lead instructor will complete requirements for the laser safety officer certification.
3. The program will receive an adaptive optics (AO) demonstrator from UCSC Center for Adaptive Optics to facilitate classroom instruction in AO.
4. The program will purchase fiber optics splicing equipment.
5. The program will develop and implement a recruitment strategy to increase overall enrollment as well as nontraditional participation.
6. The program will review and develop where appropriate student learning outcomes at the course level.
7. The program will develop assessment strategies for the program student learning outcomes.
8. The program will explore distance learning strategies with Maui CC and Kauai CC in an effort to improve efficiency ratios.
9. Equipment and other budget needs not covered by the normal program budget include the following:

> Video conferencing capabilities for the lab to transmit and receive classes from Kauai CC and Maui CC $10,000
> Photonics equipment for classroom $9,000

Data Chart

QUANTITATIVE TREND DATA CHART

Program Name: Electronics Tech.

	Fall	Spring	AY

	2005	2006	
#1 Number of Unduplicated Majors	37	28	39
#2 Total Student Semester Hours	430	278	708
#3 FTE Student Majors	28.67	18.53	23.60
#4 Number of Graduates	–	–	13
#5 Number of classes	8	7	15
#6 Avg Class size	11.13	9.14	10.20
#7 Avg Class fit	55.6%	45.7%	51.0%
#8 FTE of BOR Appointed Program Faculty	–	–	1
#9 Number of FTE Faculty	–	–	2.29
#10 Student semester hours for all PPC class enrollments	244	197	441
#11 Student-Faculty Ratio	–	–	6.43
#12 PPC Credits Earned Ratio	.91	.91	.91
#13 Non-PPC Credits Earned Ratio	.91	.76	.83
#14 PPC Avg GPA	2.86	2.80	2.83
#15 Non-PPC Avg GPA	2.91	2.62	2.77
#16 Budget	–	–	5146.00
#17 Program Cost per SSH***	–	–	180.49

*** - calculated using rank 4 rate per credit hour of instruction

The Program Health Indicators Review provides a comprehensive, empirically based review of academic programs. Major sections of the report provide descriptive information about the development and history of a program, goals, faculty and advisory committees, admission and degree requirements, and graphic representation of the program's standing. The major clusters of program health indicators are program demand, program efficiency and program outcomes. Hawai'i Community College uses five data elements to develop these clusters: number of applicants and majors (program demand), class fit and average class size (program efficiencies) and graduates (program outcomes).

Chancellor :   Rockne Freitas
Vice-Chancellor for Academic Affairs   Doug Dykstra
Department Chair (Interim):   Clyde Kojiro

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PROGRAM DESCRIPTION

The Electronics Technology program is placed in the Applied Technical Education Division of the Transportation and Applied Technology Department of the Hawai'i Community College. Other programs within this department include: Auto Body Repair and Painting, Automotive Mechanics Technology, Diesel Mechanics, and Machine, Welding and Industrial Tech.

The program prepares individuals to fabricate, install, test, troubleshoot, repair and maintain electronic components, equipment and systems. Students advance from basic electrical and electronic courses to specialized studies of microcomputer systems and telecommunications.

The two year AAS degree program includes coursework in direct and alternating current electricity, analog and digital electronic circuits, microprocessors, analog and digital telecommunication systems. The program includes co-requisite courses in algebra and trigonometry, written and oral communications and information technology courses.

Graduates normally attain the Federal Communications Commission General Radiotelephone Operators License (GROL) and other certificates within the field of electronics and should qualify for entry-level employment in the installation, maintenance and sales positions. Some applicable job titles are electronic bench technician, field service technician/representative and control/instrumentation technician.

PROGRAM GOALS

1. The first goal of the Electronics Program is to provide the student with an education in Electronics.

2. The second goal is to provide the student with skills and knowledge necessary for entry and retention in electronics and electronics related industries.

3. The specific objectives of this program are to enable the student to understand the fundamental concepts and to work with electronic circuits, instruments and tools. These objectives were derived from the publication, Inventory of Competencies and Skills: a guideline established for the Community College System by a committee of community college instructors.

A student completing this program should be able to:

- Understand and apply basic electrical theory to analyze electrical circuits, including the concept of grounding.
- Understand and apply Ohm's Law to analyze circuits.
- Use and read electronic schematics
- Understand and analyze circuits: Series, Parallel, and Series-Parallel.
- Identify and test electronic components in Series, Parallel and Series-parallel circuits.
- Understand and apply fundamentals of magnetism when working with inductive circuits.
- Understand and apply basic Alternating Current (A. C.) theory for circuit analysis using algebra.
- Identify, analyze, and test inductive circuits.
- Identify, analyze and test capacitive circuits.
- Identify, analyze and test resonant circuits.
- Identify, analyze and test filter circuits.
- Understand fundamental characteristics of various semiconductors and be able to identify and test various semiconductor devices, diodes and transistors.
- Identify and describe the functions of each of the seven layers of the OSI reference model.
- List the key internetworking functions of the OSI Network layer.
- Identify the functions of each layer of the ISO/OSI reference model.
- Identify the functions of the TCP/IP network-layer protocols.

The student should be able to:

- Demonstrate practical competencies and skills.
- Identify, use correctly and safely various hand tools for repairing electronics devices.

- Solder and de-solder electronic components properly.
- Operate a VOM and read the scale properly.
- Operate an Oscilloscope and read and interpret the display accurately.
- Operate a Function generator, Audio generator, and RF generator.
- Measure capacitance, inductance and resistance.
- Use good verbal communications.
- Troubleshoot and repair equipment that contains digital electronics.
- Troubleshoot and repair Color Television sets.
- Troubleshoot and repair Audio systems.
- Troubleshoot and repair AM and FM Receivers.

PROGRAM HEALTH INDICATORS

INDICES	MINIMUM LEVEL	ACTUAL LEVEL	SATISFACTORY LEVEL
PROGRAM DEMAND/CENTRALITY: Fall 2006			
Number of Applicants	30	19	45
Number of Majors	40	20	60
Student Semester Hours	240	120	360
Class Credit Hours	24	24	24
Number of Classes Taught	8	8	8
PROGRAM EFFICIENCY: Fall 2006			
Average Class Size	10	5	15
Student Semester Hours per FTE Faculty	133	60	200
Equiv. Class Credit Hours per FTE Faculty	13.3	12	13.3
Percentage of Small Classes	50%	100%	0%
PROGRAM OUTCOMES: (See Perkins III Core Indicators on Page 5)			
Credits Earned Ratio – General Education		00%	
Credits Earned Ratio – Vocational Education		00%	
Degrees and Certificates Awarded – AY 2001-2002		00%	
Placement into Further Education, Employ, or Military		00%	
Program Retention – Fall to Spring		00%	
Retention in Employment		00%	
Non-Traditional Program Participation – Female		00%	
Non-Traditional Program Completion – AY 2001-2002		00%	

2005-2006 PERKINS III CORE INDICATORS

Core Indicators	# in Denominator	# in Numerator	Adjusted Level	Actual Level
Academic Achievement	15	14	81.92%	93.33%
Vocational Skills	18	16	90.00%	88.89%
Degrees & Certificates	18	10	37.33%	55.56%
Placement/Employment	5	4	71.72%	80.00%
Retention/Employment	4	4	92.00%	100.00%
Nontraditional Participation	33	4	14.60%	12.12%
Nontraditional Completion	13	0	12.73%	0.00%

OCCUPATIONAL DEMAND
Hawai'i County - 1998-2008

Occupational Title	State 2005	Hawaii County 2005	Hawaii County New 2005-2011	State Replacement 2005-2011	Hawaii County Replacement 2005-2011
Computer Electronics & Network Tech	1212	61	13	77	4
Electronics & Comp Engin Tech/Electronics Technology	877	95	-14	65	7
Medical lab technician	1059	92	24	167	15
Total demand 2005-2011 = 49					

Source: EMSI Table for Hawaii County

ANALYSIS OF THE PROGRAM

Program demand/Centrality

The statistics for program demand are below the minimum and satisfactory level in the three main categories: number of applicants, majors, and student semester hour. The program has not been successful in recruiting new students.

Program Efficiency

The statistics for program efficiency are below the minimum and satisfactory level in all categories. This is a result of program demand being below the pre-determined levels.

Program Outcomes

The program is above the adjusted level of performance in the areas of academic achievement, credentials, placement, and retention. It's vocational skill percentage (88.89%) is only slightly below the desired performance level of 90.0%

The program is below the adjusted level of performance in the nontraditional participation and nontraditional completion categories.

Plan of Action 2005-2006

The major plan of action in the area of curriculum changes involves course number changes to 100 and above to articulate with Kauai and Maui Community Colleges. Equipment upgrades and/or replacement are critical to prepare our students for immediate employment, upgrading and career mobility. Most of our full time students are employed as student workers and as student interns during the summer months in many of the observatories and can secure full-time employment upon graduation. We plan on focusing on providing short term courses for upgrading and career mobility and continue our program of offering and proctoring of the FCC licenses and certifications.

Students enrolled in ET43 (a fourth semester course) continues to provide the community and DOE schools with recycled computers and printers which were serviced and upgraded by the students as part of their coursework as pro bono work.

Response to last year's plan of action

The move to 100 level courses is still in process. The college continues to work with Maui CC and Kauai CC to develop a common core of classes. The lead instructor continues to upgrade his skills in the areas of photonics, fiber optics, and laser technologies in anticipation of expanding the curriculum to include these cutting edge technologies in the curriculum. The instructor received his fiber optics installer certification fall 2006. The program received a $31,000 appropriation from the legislature

to purchase needed equipment upgrades. Other funds for equipment purchases and instructor training have come through Maui CC's affiliation with NSF/EPSCOR.

The program is offering a 3 credit internship (ETRO 193) in partnership with University of California at Santa Cruz's Center for Adaptive Optics and local observatories during summer term 2007. The program also continues it recycled computer project providing local schools with 15-20 computers and printers each semester.

Plan of Action 2006-2007

10. Course upgrades and additions will be submitted to the curriculum committee fall 2008. As part of this process, curriculum will be aligned with Maui CC and Kauai CC.
11. The lead instructor will complete requirements for the laser safety officer certification.
12. The program will receive an adaptive optics (AO) demonstrator from UCSC Center for Adaptive Optics to facilitate classroom instruction in AO.
13. The program will purchase fiber optics splicing equipment.
14. The program will develop and implement a recruitment strategy to increase overall enrollment as well as nontraditional participation.
15. The program will review and develop where appropriate student learning outcomes at the course level.
16. The program will develop assessment strategies for the program student learning outcomes.
17. The program will explore distance learning strategies with Maui CC and Kauai CC in an effort to improve efficiency ratios.

Appendix A: History and Admission Requirements

Program History

The Hawai'i Technical School Electronics program opened for its first eighteen students in the Fall of 1966. An old 15' by 40' building served as classroom, shop, office, storeroom and library. Curriculum and equipment were necessarily as limited as the space. The Electronics Program offered a Certificate of Achievement upon completion of 64 credits. Three years later, in 1969, Hawai'i Technical School became a part of the University of Hawai'i's Community College system and began to offer the Associate in Science Degree in Electronics Technology. The program was housed in a large, partially air conditioned facility and had an extensive inventory of up-to-date electronic equipment. With input from the community and the Electronics Program Advisory Committee, the program was broadened to include various course electives to include Communications, Industrial, Automotive, and Computer Electronics.

The Electronics program is presently offering all of the basic electronics courses and has added two non-credit courses. These courses were added to provide non-electronics majors an introductory course in electronics and provide electronics courses that are applicable to the Pre-vocational course offerings. The program is proposing a number of changes for all electronics courses which make-up the core of its curriculum. All core electronics courses and co-requisites for electronic majors will be at the transfer level.

Program Admission Requirements

This section describes the requirements for admission, including semester(s) in which students are admitted, basis for admission, minimum qualifications, and other requisites for admission.

The Electronics Technology Program is a two-year A.A.S. degree-granting program and accepts new students only during the Fall Semester. Students desiring to enroll in the program must take the COMPASS tests for placement into the appropriate reading, writing and mathematics courses.

Appendix B: Degree Requirements

First Semester   **AAS**

Etro 20	Fundamentals of Electronics	5
Etro 20L	Fundamentals of Electronics Lab	3
Etro 23	Fabrication	2
Etro 23L	Fabrication Lab	2
** Math 66	Technical Math	4
	TOTAL	**16**

Second Semester

Etro 22	Application of Electronics	5
Etro 22L	Application of Electronics Lab	3
Etro 32	Electronic Circuit Analysis	4
Elective	Social, Natural, & Cultural Env.	
(SpCom 51 or higher recommended)		3
	TOTAL	**15**

Third Semester

Etro 40	Microprocessor Electronics	3
Etro 40L	Microprocessor Electronics Lab	3
Etro 45	Electronic Circuits/Systems	3
Etro 45L	Electronic Circuits/Systems Lab	3
Eng	Eng 21, 51, or 22 or higher	3
Elective	Social, Natural, & Cultural Env.	3
	TOTAL	**18**

Fourth Semester

Etro 43	Computer Electronics	4
Etro 43L	Computer Electronics Lab	3
Etro 57	Electronics Servicing	2
Etro 57L	Electronics Servicing Lab	3
Elective	Social, Natural, & Cultural Env.	3
	TOTAL	**15**
	TOTAL	**64**

<u>Appendix C: Faculty</u>

Regular Faculty

<u>Name</u>	**<u>Tenure Status and date</u>**	**<u>Degrees Held</u>**	**<u>Rank</u>**
Harvey Motomura	Tenured, 1987	B.S., M.Ed.	C-4

Part-time Faculty

<u>Name</u>	**<u>Tenure Status and date</u>**	**<u>Degrees Held</u>**	**<u>Rank</u>**
Brent Runnells	Lecturer	A.S.	

Appendix D: Advisory Committee

Stephen Hatada, Owner, Hatada's TV, Inc.

Dave Okamura, Radio Shop Supervisor, HELCO

Blaine Oyama, Systems Engineering Manager, Time-Warner Oceanic

Chris Stewart, Independent RF Consultant

Michael Texeira, Owner, Business Automation

John Wong, Technician, Verizon Hawaii

Budget:

Use fiber optic perkins proposal plus 2 items

Appendix E: Definitions of Data Elements (All data includes West Hawaiʻi)

A. Program Demand/Centrality:

1. Number of Applications: Total number of applications received complete and incomplete.

2. Number of Majors: Major declared/on file during the semester.

3. Student Semester Hours: Total number of semester hours based upon class credits and student enrollment. Sum of all class credits multiplied by the enrollment for each class. Includes practica and other classes where 5 students = 1 semester (credit) hour. Excludes cancelled, 99V, 199V, 299V, and all CVE classes.

4. Class Credit Hours: Sum of credits of all classes offered within the program/with the program/major code/alpha. Includes practica and other classes where 5 students = 1 semester (credit) hour. Excludes cancelled, 99V, 199V, 299V, and all CVE classes.

5. Number of Classes Taught: Total number of classes conducted/run within the program/with the program/major code/alpha. Includes practica and other classes where 5 students = 1 semester (credit) hour. Excludes 99V, 1 99V, 299V, and all CVE classes.

B. Program Efficiency:

1. Average Class Size: Average class size of all classes conducted/run within the program/with the program/major code/alpha. Includes practica and other classes where 5 students = 1 semester (credit) hour. Excludes 99V, 199V, 299V, and all CVE courses. Total enrollment in each class excludes students with "DR" and/or "W" grades.

2. Student Semester Hours per FTE Faculty: Total student semester hours from A.3. divided by analytical FTE Faculty.

   a. Analytical FTE Faculty: Teaching based upon a full load (15 or 12 credits depending upon the contact hours.) Division Chairpersons are assigned an analytical FTE Faculty equivalent of 0.70 FTE.

   b. Each full-time faculty within a program is considered to be 1 FTE. FTE based upon lecturers are calculated by the number of credits each are assigned to teach.

   c. Assigned time is to be extracted from FTE calculations …similar to calculating the FTE for a Division Chair. For example, if a Full-time faculty received 3 credits assigned time (out of a regular 15-credit load) it would be considered a .8 FTE rather than 1.

3. <u>Equivalent Class Credit Hours per FTE Faculty</u>: Total class credit hours from A.4. divided by total analytical FTE Faculty.

4. <u>Percentage of Small Classes</u>: Percent of classes within the program/with the program/major code/alpha that had less than 10 students. Includes practica and other classes where 5 students = 1 semester (credit) hour; however, these classes are considered to be Low-enrolled only if there are less than 5 students or between 6 and 9 students. Excludes 99V, 199V, 299V, and all CVE classes.

C. Program Outcomes:

1. <u>Credits Earned Ratio (Remedial/Developmental):</u> Percentage of program majors enrolled in ESL 9, ESL 13, ENG 20R, ENG 20W, ENG 51, LSK 51, MATH 22, and MATH 50 who passed with a grade of A, B, C, D or CR.

2. <u>Credits Earned Ratio (General Education):</u> Percentage of program majors enrolled in all LBART courses (excluding those in C.1.) who passed with a grade of A, B, C, D or CR. Includes practica and other classes where 5 students = 1 semester (credit) hour. Excludes 99V, 199V, 299V, and all CVE courses.

3. <u>Credits Earned Ratio (Vocational Education):</u> Percentage of students enrolled in vocational courses who passed with a grade of A, B, C, D or CR. Includes practica and other classes where 5 students = 1 semester (credit) hour. Excludes 99V, 199V, 299V, and all CVE courses.

4. <u>Credits Earned Ratio (Overall):</u> Combination of C.1., C.2., and C.3. above.

5. <u>Graduate Placement Rate</u>: Students who graduated with a certificate/degree in the PAST academic year and found work in that field.

6. <u>Degrees Awarded</u>: The number of certificates and degrees awarded during the PAST academic year.

7. <u>Retention Rate</u>: New students within a program/major continuing or retained in that program/major from the past two or more terms. (Students registered in Fall 2000 who started in Spring 2000 or Fall 1999. Students registered in Fail 2001 who started in Spring 2001 or Fall 2000.)