HAWAI`I COMMUNITY COLLEGE
PROGRAM REVIEW REPORT

ELECTRONICS TECHNOLOGY (ETRON) PROGRAM

November 30, 2007

Assessment Period: July 1, 2004 to June 30, 2007

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Program Review at Hawai'i Community College is a shared governance responsibility related to strategic planning and quality assurance. It is an important planning tool for the college budget process. Achievement of Student Learning Outcomes is embedded in this ongoing systematic assessment. Reviewed by a college wide process, the Program Reviews are available to the college and community at large to enhance communication and public accountability.

HAWAII COMMUNITY COLLEGE
ELECTRONICS TECHNOLOGY (ETRON)
PROGRAM
2007-2008

A. Program Effectiveness

1. The Electronics Technology Program, in alignment with the UHCC's and HawCC's mission, accepts all students from all segments of our Hawai'i Island community that meets the program's entry requirements to prepare individuals to fabricate, install, test, troubleshoot, repair and maintain electronics components, equipment and systems. Some of the courses are scheduled at times convenient for the employers and working students seeking professional upgrade training and certifications in this fast-paced industry. (Refer to Figure 1 below.

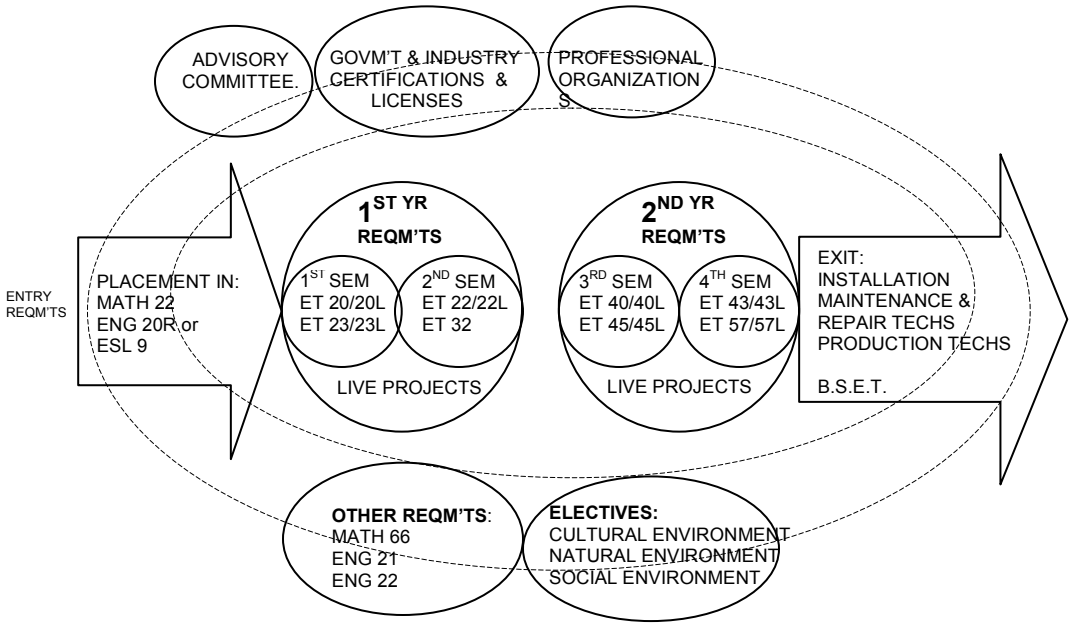

Figure 1

2. The Electronics Technology Program's PLOs closely models other UHCC Electronics Technology Programs PLOs in preparation of a distance-learning partnership with Maui CC and Kauai CC and is guided by the Program's Electronics Technology's Advisory Council, The Federal Communication Commission General Radiotelephone Operator License (GROL) requirements, along with other industry-based competency standards such as the Cisco CCNA and CompTIA's A+ and Networking+ certification requirements in order to meet de facto electronics industry standards.

Analysis/Discussion of PLOs assessments:
Successful completion of the prescribed sequence of courses, which have performance and written tests are used for PLO assessment for each semester and was developed from both governmental (FCC) and non-vendor specific based assessments, along with the assessment of the student as part of a team in the troubleshooting and repairing of "live projects" to increase the depth and application of the knowledge and skills acquired.

Table 1—List of Program Learning Outcomes

"The student will demonstrate the knowledge and skills required for employment in a wide variety of industries, performing numerous tasks; develop a good sense of work ethics, positive discipline, and attitudes and abilities that will make him/her to be highly marketable in this fast-growing, dynamic field of electronics".

PLO #1 - The student will be able to specify, design, build, install, program, operate, troubleshoot, analyze, and modify electronics systems, automated test, and manufacturing control systems. The student will also be able to specify, install, program, operate, troubleshoot , and modify computer systems.
PLO # 2 – The student will have effective written, interpersonal, presentation, and team building skills.
PLO # 3 – The student will have the necessary leadership and management skills to effectively complete a project.
PLO # 4 – The student will have a well-developed sense of work ethics and personal discipline to succeed in their chosen profession.
PLO # 5 – The student will have attitudes, abilities, and skills required to adapt to rapidly changing technologies and a desire for life-long learning.

Table 2—Program Learning Outcomes by Courses

Course Alpha & #	PLO #1	PLO #2	PLO #3	PLO #4	PLO #5
ETRO 20 Fundamentals of Electronics	X	X	X	X	X
ETRO 20L Fundamentals of Electronics Lab	X	X	X	X	X
ETRO 23 Fabrication	X	X	X	X	X
ETRO 23L Fabrication Lab	X	X	X	X	X
ETRO 22 Application of Electronics	X	X	X	X	X
ETRON 22L Application of Electronics Lab	X	X	X	X	X
ETRON 32 Electronic Circuit Analysis	X	X	X	X	X
ETRON 40 Microprocessor Electronics	X	X	X	X	X
ETRON 40L Microprocessor Electronics Lab	X	X	X	X	X
ETRON 45 Electronics Circuits/Systems	X	X	X	X	X
ETRON 45L Electronics Circuits/Systems Lab	X	X	X	X	X
ETRON 43 Computer/Networking & Hardware	X	X	X	X	X
ETRON 43L Computer/Networking & Hardware Lab	X	X	X	X	X
ETRON 57 Electronics Servicing	X	X	X	X	X
ETRON 57L Electronics Servicing Lab	X	X	X	X	X

Table 3—Levels of Implementation of PLO Assessment

	A	D	P	SCQI	Assessment Strategy
PLO #1		X			Instructor's assessment of student's application of learning through standardized written test performance and quality of lab experiment reports submitted, including articulation of knowledge and skills reflected in the completion of "live projects" assigned.
PLO #2		X			"
PLO #3		X			"
PLO #4		X			"
PLO #5		X			"

Key (reference: Barbara Beno's letter, 9-12-07; ACCJC's evaluation of Institutional effectiveness, rubric III): A=Awareness, D=Development, P=Proficiency, SCQI= Sustainable Continuous Quality Improvement

Table 4A—Percentage of Program Courses with SLO's

100% of Program courses with SLO's	Of these, 100% are being assessed

Table 4B—Percentage of Program Courses Reviewed within the Previous 5 Years
100%

3. Program Strengths and Weaknesses

The Electronics Technology Program's "live projects" is our capstone "win-win" activity. Besides doing our part in the recycling of electronic items such as TVs and computers from reaching the landfill, donations from the community are repaired by the students and given to organizations that need them. Long standing benefactors of this project includes the State Department of Safety, DOE, State Library, Life Care Center of Hilo and other non-profit organizations at no cost.

The program's health reflects a "unhealthy" indice during this review period. Action plan to remediate this standing involved more than two years of consultations between campuses with faculty up-grade training to develop a distance learning strategy with Maui CC and Kauai CC to team teach new and emerging state-of-the-art photonics topics. This action plan involved the revision of 19 credits to the core curriculum (7 credits to accommodate the photonics topics of lasers, fiber-optics and adaptive optics technologies and 12 credits to accommodate the first 4 courses of the Cisco Networking Academy program in fulfilling the graduation requirements for the program's A.A.S degree and will better prepare the students with current technology skill sets. Other changes includes course offerings more suited for the working students as well as the traditional students to improve the program's efficiency ratios in increasing the program's enrollment.

Program Strengths

S1

The program focuses on efforts to increase the employability of its graduates. In this field, certifications and licensing has become the de facto hiring standard for prospective employers as it attests to the person's knowledge and skills. Often times, certification leads to a raise in pay or a higher position at the time of hire. At the end of each semester and throughout the four semesters, the students are administered an FCC exam that serves to assess the SLOs as appropriate to the intended course. Additionally, the program continually assesses the student's progress with written tests, performance tests and assessed as an individual student working in teams on assigned "live projects" using up-to-date measures developed from independent and vendor specific standards. The program has had its curriculum reviewed by the National Association for Radio, Telecommunications and Electromagnetics (NARTE) to become the only authorized proctoring site in the State of Hawaii for the FCC General Radiotelephone Operators License (GROL). This license has become the benchmark for many communications, transportation, utility and manufacturing corporations as well as the US military to mandate the NARTE certification as a pre-requisite to employment.

S2

The program through generous funding from the State legislature, EPSCor, Perkins, UC Santa Cruz Center for Adaptive Optics (CfAO) and the NSF – ATE, funded for instructor up-grade training to attend various professional development and certification courses and for the program with state-of-the-art trainers and equipment up-grades as the Action Plan to improve the program's health efficiencies. The various funding appropriations to the program will allow the program to keep abreast with the rapidly changing field in electronics and will provide for most of the training for employment in the lucrative astronomical observation field on Mauna Kea and Mauna Loa. Matriculated students in the program are oftentimes solicited for part-time employment as "student workers" in such high-tech environments during the semester and for the summer, providing the students with valuable skills and work experience to succeed in the workforce.

S3

In this field, it seems as if everyday there's another unveiling or breakthrough being produced in this field of technology that supports the student learning. Fortunately, the program's close partnership with its advisory committee and the high-tech astronomical observatory consortium has provided for a tremendous degree of support in terms of curriculum advisement, job placement assistance, equipment donations and the maintenance of the program. This has relieved the program from expending it's fund cites for crucial but expensive equipment acquisitions and utilize its funding to sustain the program's daily needs through the academic year. All student computer workstations for student use were acquired in the form of donations from the industry and are refurbished and maintained by the students themselves with older versions recycled and given to

organization that need them. The program's "live projects" experience gives the students viable skills in the installation of operating systems and other programs, the troubleshooting and modification of computer systems as stated in the PLO #1.

Program Weaknesses

W1
The facility's existing square footage does not provide for an efficient working space for students, especially in the non air-conditioned lab. During lab, the jalousies and the bay door are opened fully for maximum ventilation to dilute solder fumes and other odors but this also allows for the inducement into the lab, exhaust fumes from vehicles passing by the shop and from the paint fumes from the adjacent building's paint booth. With the anticipated implementation of laser and optics courses in which the associated equipment is highly temperature sensitive, and to be used in a dust-free environment, this requisites will necessitate air-conditioning the lab facilities.

W2
With a program health indicator effectiveness of "cautionary", the program in partnership with Maui CC and Kauai CC have articulated its course offerings to include a high-tech photonics curriculum to better prepare the students entering the high-tech workforce. The new photonics curriculum cleared the curriculum committee in Fall 2007 and plans to be fully implemented in the Spring Semester 2008. It is the hope of this program that the new and emerging photonics topics may increase the program's enrollment from students currently enrolled at UHH and at the same time offer our students the option to transfer to UHH's baccaulaureate programs upon graduation to support life-long learning imperatives.

W3
As the electronics field becomes more advanced, so do the skills needed to repair the devices or equipment when they break down. This fast-growing dynamic field of electronics has placed our graduates in a wide variety of industries (see page 13) finding in-service technicians with no avenue for up-grade training to keep one's knowledge current and skills to be highly marketable. The program places a high value on the social forces of the industry for their generous equipment donations throughout the years and in its response to provide maximum learning opportunities is developing Certificate of Achievement and Certificate of Completion courses as a way of effectively serving the community especially to the in-service technicians and graduates willing to keep abreast of changes in technology and desirous of sustaining their employability and is only hampered by budgetary implications to acquire the trainers and other equipment.

B. Action Plan including Budget Request

Tables 5, 6 & 7

The assessments and improvements of the PLOs and SLOs is a vital part as the program begins to implement recently approved curriculum changes beginning in the Spring 2008 semester. The new course offerings will be mirrored with Maui and Kauai CCs offerings for team-teaching activities to share respective expertise, and scheduling of courses to reduce the faculty workloads.

Because electronics is fast-growing and dynamic with a wide variety of industries that employs our graduates, the program is constantly upgrading and replacing hardware and software to maintain currency and is only hampered by the budgetary implications to acquire state-of-the-art trainers and other associated equipment.

Table 5—Top 6 Non-Cost Items (Including SLO & PLO completion, and assessment)

Task:	Academic yr.	Who is responsible	Best Fits which ADP Goal	Addresses which strength or weakness
1. Assess and implement SLO & PLO changes for the new Photonics course offerings	2008 and beyond	Program Coordinator	A,B,C, & D	W1, W2, & W3
2. Acquisition of multiple trainers and test instruments	2008 and beyond	Program Coordinator	A,B,C, & D	W1, W2, & W3
3. With funding continue to expand course offerings	2008 and beyond	Program Coordinator	A, B C, & D	W3
4. Promote the program in the high schools	2008 and beyond	Program Coordinator	A, B, & D	W3
5. Work with High school science classes to introduce state-of-the-art technologies	2008 and beyond	Program Coordinator	A, B, & D	W3
6. Participate in workshops, DOE events to promote program	2008 and beyond	Program Coordinator	A, B, & D	W3

Key to abbreviations:
ADP Goals are: A, B, C, D, E
Strengths/Weaknesses are numbered (S1, S2… W1, W2…--from A.3.

Table 6A. —Top 6 Cost Items

Task:	Academic Yr.	Who is responsible	$ amount & budget category Except R/M	Best fits which ADP Goal	Supported by ADP Resource Require-ment? Y/N	Addresses which strength or weakness
1. Hire 1 FTE-Faculty	2007-8	Program Coord.	$50K, P	A	N	W1, 2, 3
2. Furnish Photonics Lab	2008-9	Program Coord.	$30K, EQ	A	N	W1, 2, 3

Key to abbreviations:
ADP Goals are: A, B, C, D, E
Budget Categories: P=Personnel; S1x=Program Review Special Fund; SE=Supplies Enhanced; Eq=Equipment
Strengths/Weaknesses are numbered (S1, S2, S3, W1, W2, W3—from A.3)

Table 6B.--Repair and Maintenance

Nature of Problem	Describe Location: e.g. Building(s) & Room(s)
Installation of air-conditioning of ETRON lab	Bldg 391, Rm 2

Table 7—Equipment Depreciation, if applicable

Program Assigned Equipment (E) and Controlled Property (CP) (List in order of chronological depreciation date)	Category: CP or E	Expected Depreciation Date	Estimated Replacement Cost
Panel Mounted Student Power Supply	CP	1987	$13K
Desoldering Station	CP	1990	$3K
Student Workbenches	E	2000	$10K

Key to abbreviations:

CP=Controlled Property w/item value $1K-$5K

E=equipment w/item value >$5K;

Table 8 Data Elements

	AY 04-05	AY 05-06	AY 06-07
ET			
1. Annual new and replacement positions in the State	942	942	942
2. Annual new and replacement positions in the County	-7	-7	-7
3. Number of majors	41	36	19
4. Student Semester Hours for program majors in all program classes	366	261	120
5. Student Semester Hours for Non-program majors in all program classes	0	0	0
6. Student Semester Hours all program classes	366	261	120
7. FTE Program enrollment	24.4	17.4	8
8. Number of classes taught	8	8	8
9. Determination of program's health based on demand (Health, Cautionary, or Unhealthy)	Healthy	Cautionary	Unhealthy
10. Average Class Size	15.5	10.88	5
11. Class fill rate	77.5%	54.38%	25%
12. FTE of BOR appointed program faculty	1	1	1
13. Student/Faculty ratio	41:1	36:1	19:1
14. Number of Majors per FTE faculty	25.63	22.5	11.88
15. Program Budget Allocation (Personnel, supplies and services, equipment)	$81,494.00	$80,294.00	$79,168.00
16. Cost Per Student Semester Hour	$222.66	$307.64	$659.73
17. Number of classes that enroll less than ten students	0	0	8
18. Determination of program's health based on Efficiency (Healthy, Cautionary, or Unhealthy)	Cautionary	Unhealthy	Unhealthy
19. Persistence of majors fall to spring	80.49%	72.22%	78.95%
20. Number of degrees earned (annual)	5	13	7
21. Number of certificates earned (annual)	0	0	0
22. Number of students transferred (enrolled) to a four-year institution in UH	0	0	0
23. Perkins core indicator: Academic Attainment(1P1)	85.71%	75.00%	93.33%
24. Perkins core indicator: Technical Skill Attainment (1P2)	88.89%	90.00%	88.89%
25. Perkins core indicator: Completion Rate (2P1)	22.22%	50.00%	55.56%
26. Perkins core indicator: Placement in Employment Education, and Military (3P1)	66.67%	100.00%	80.00%
27. Perkins core indicator: Retention in Employment (3P2)	100.00%	100.00%	100.00%
28. Perkins core indicator: Non Traditional Participation (4P1)	5.88%	5.56%	12.12%
29. Perkins core indicator: Non Traditional Completion (4P2)	.00%	.00%	.00%
30. Determination of program's health based on effectiveness (Healthy, Cautionary, Or Unhealthy)	Cautionary	Healthy	Healthy
31. Determination of program's overall health (Healthy, Cautionary, or Unhealthy)	Cautionary	Cautionary	Cautionary
32. Number of FTE Faculty	1.6	1.6	1.6

NAME _____ SEMESTER/YEAR BEGAN ET _____

HAWAII COMMUNITY COLLEGE, 2007-2008
Electronics Technology (ET)

Program Requirements (Overall [64 credits, cumulative GPA 2.0 required from all courses])

Course	Course Name	Semester, Year & Grade	AAS Credits
FALL:			
ETRO 20	Fundamentals of Electronics		5
ETRO 20L	Fundamentals of Electronics Lab		3
ETRO 23	Fabrication		2
ETRO 23L	Fabrication Lab		2
SPRING:			
ETRO 22	Application of Electronics		5
ETRO 22L	Application of Electronics Lab		3
ETRO 32	Electronic Circuit Analysis		4
FALL:			
ETRO 40	Microprocessor Electronics		3
ETRO 40L	Microprocessor Electronics Lab		3
ETRO 45	Electronic Circuits/Systems		3
ETRO 45L	Electronic Circuits/Systems Lab		3
SPRING:			
ETRO 43	Computer/Networking & Hardware		4
ETRO 43L	Computer/Networking & Hardware Lab		3
ETRO 57	Electronics Servicing		2
ETRO 57L	Electronics Servicing Lab		3
MATH 66	Trig & Algebraic Topics		4
ENG 21 or higher **OR** ENG 22/ESL 15 or higher	Developmental Reading Introduction to Expository Writing		3
1. Cultural Environment Elective [1 COURSE REQUIRED – 3 cr.] **ART** 101, 105B, 105C, 107, 107D, 108, 111, 112, 113, 114, 115, 123, 125, 126, 202, 207, 211, 212, 214, 217, 223, 227, 230, 238, 239, 243, 244, 269C, 294 **ASAN** 120†, 121†, 122†, **DNCE** 153, 185, 256†, 285, **ED** 256† (see DNCE 256), **ENG** 103, 204, 205† (see JOUR 205), 255, 256, 257A, 257E, **HAW** 101, 102, 103, 201, 202, **HIST** 123, 151, 152, 153, 154, 241, 242, 274, 281, 282, 284, 288, **HUM** 100, 160† (see SSCI 160), 275, **HWST** 107, 123, 124, 125, 126, 128, 129, 130, 131, 141† (see HSER/SUBS 141), 160, 161, 170A, 170B, 205, 221†, 224, 231, 232, 235, 236, 237, 241, 242, 250, 251, 260, 261, 268, 269, 270, **IS** 55, **JOUR** 205† (see ENG 205), **JPNS** 101, 102, 121, 122, **LING** 102, 121†, **PHIL** 100, 101, 102, 120, 211, 213, 255, **PSY** 275, **REL** 150, 151, 152, 153, **SPCO** 231, 251			3

2. Natural Environment Elective [1 COURSE REQUIRED – 3 cr.] **AG** 54B, 122, 141, 175-175L, 200, 250, 260, **ASTR** 110, **BIOC** 241, **BIOL** 100-100L, 101-101L, 141-141L, 142-142L, 156-156L, **BOT** 101-101L, 130-130L, **CHEM** 100-100L, 151-151L, **FSHN** 185, **GEOG** 101-101L, 122, 170-170L, 180-180L, **GG** 101-101L, **MICR** 130-130L, **OCN** 201, 205, **PHRM** 203, **PHYS** 25, 50, 55, 56, 100-100L, **SCI** 20, 51, 124-124L, 222, **ZOOL** 101-101L		3
3. Social Environment Elective [1 COURSE REQUIRED – 3 cr.] (SpCo 51 or higher recommended) **AJ** 101, 180, 210, 256† (see HSER/WS 256), 280, 290B, 290C, 290D, **ANTH** 121, 150, 200, **ASAN** 120†, 121†, 122†, **BUS** 71, **ECON** 20, 50, 120, 130, 131, **ED** 105, 131, **FAMR** 230, **GEOG** 102, **HD** 234, **HSER** 110,140, 141† (see HWST/SUBS 241), 248† (see SUBS 248), 256† (see AJ/WS 256), **HWST** 221†, **ICS** 100, **IEdB** 20, **LAW** 30, **MGT** 20, 24, **POLS** 110, **PSY** 100, 170, 214, 230, 270, 275, **SOC** 100, 208, 218, 251, 265, 289, 290, **SPCO** 51, 130, 151, 260, **SSCI** 25, 45, 60, 111, 150, 160† (see HUM 160), 250, **SUBS** 141† (see HSER/HWST 141), 248† (see HSER 248), 268, 270, 275, 280, **WS** 151, 256† (see HSER/WS 256)		3
	Total Credits:	***64***

Courses completed that do not apply to major

Course	Sem., Yr. & Grade	Course	Sem., Yr. & Grade

Entry Requirements

- Proficiency levels in both reading and mathematics must be met for entry into the program:

Subject Area	Placement into course
Mathematics	MATH 22
Reading	ENG 20R or ESL 9

†These courses are cross-listed but will only count once for graduation requirements.

TABLE 2
AVERAGE ANNUAL AND TOTAL JOB OPENINGS
2002 AND 2012
STATE OF HAWAII

SOC Code	Occupation Title	Employment 2002	Employment 2012	Change Number	Change Percent	Average Annual Openings Due To Growth	Average Annual Openings Due To Separations	Average Annual Openings Total
47-4041	Hazardous Materials Removal Workers	170	230	60	35.3	10	*	10
49-0000	**Installation, Maintenance, & Repair Occupations**	**22,040**	**24,890**	**2,850**	**12.9**	**290**	**500**	**790**
49-1000	Supervisors of Installation, Maint, & Repair Worker	2,150	2,420	270	12.6	30	50	80
49-1011	First-Line Sup/Mgr of Mechan, Installr, & Repairer	2,150	2,420	270	12.6	30	50	80
49-2000	Electrical & Electron Equip Mech, Installr, & Repairer	2,290	2,420	130	5.7	20	40	60
49-2011	Computer, Automated Teller, & Off Mach Repairer	530	560	30	5.7	*	10	10
49-2022	Telecom Equip Installr & Repairer, Ex Line Installr	480	450	-30	-6.3	0	10	10
49-2091	Avionics Technicians	240	250	10	4.2	*	10	10
49-2092	Electric Motor, Power Tool, & Related Repairers	70	70	0	0.0	*	*	*
49-2093	Electric & Electronic Installer & Repair, Transp Eq	110	110	0	0.0	0	*	*
49-2094	Elec & Electron Repair, Commercial & Industrl Eq	420	480	60	14.3	10	10	20
49-2097	Electronic Home Entertainmnt Eq Installr & Repair	160	160	0	0.0	0	*	*
49-2098	Security & Fire Alarm Systems Installers	160	210	50	31.3	10	*	10
49-3000	Vehicle & Mobile Equipment Mechanics, Installers	5,920	6,520	600	10.1	60	150	210
49-3011	Aircraft Mechanics & Service Technicians	1,050	1,130	80	7.6	10	20	30
49-3021	Automotive Body & Related Repairers	560	610	50	8.9	10	10	20
49-3023	Automotive Service Technicians & Mechanics	2,390	2,670	280	11.7	30	60	90
49-3031	Bus & Truck Mechanics & Diesel Eng Specialists	850	940	90	10.6	10	20	30
49-3042	Mobile Heavy Equip Mechanics, Except Engines	440	480	40	9.1	*	10	10
49-3051	Motorboat Mechanics	80	90	10	12.5	*	*	*
49-3052	Motorcycle Mechanics	50	70	20	40.0	*	*	*
49-3053	Outdoor Power Equip & Other Small Engine Mech	90	110	20	22.2	*	*	*
49-3093	Tire Repairers & Changers	170	170	0	0.0	0	10	10
49-9000	Other Installation, Maint, & Repair Occupation	11,680	13,540	1,860	15.9	190	250	440
49-9012	Control & Valve Installr & Repair, Ex Mechnl Door	60	80	20	33.3	*	*	*
49-9021	Heating, Air Cond, & Refrigeration Mech & Install	710	910	200	28.2	20	10	30
49-9041	Industrial Machinery Mechanics	480	560	80	16.7	10	10	20
49-9042	Maintenance & Repair Workers, General	6,740	7,950	1,210	18.0	120	130	250
49-9043	Maintenance Workers, Machinery	200	220	20	10.0	*	*	10
49-9062	Medical Equipment Repairers	130	150	20	15.4	*	*	10
49-9091	Coin, Vending, & Amusement Mach Serv & Repair	120	140	20	16.7	*	*	10
49-9096	Riggers	210	220	10	4.8	*	*	10
49-9098	Helper--Installation, Maintenance, & Repair Worker	690	810	120	17.4	10	20	40
49-9099	Installation, Maintenance, & Repair Worker, Other	1,010	1,070	60	5.9	10	20	30

Extracted from "Employment Outlook for Industries and Occupations, State of Hawaii" - Published by the Research & Statistics Office – Department of Labor & Industrial Relations