

**HAWAII COMMUNITY COLLEGE  
ANNUAL INSTRUCTIONAL  
PROGRAM REVIEW**

**Diesel Mechanics**

**APRIL 2, 2007**

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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 Diesel Mechanics Program prepares students for employment as skilled trades' persons who maintain, repair and troubleshoot problems with engines, trucks, tractors, boats and other heavy equipment, particularly those running on diesel.

The program has no entry requirements so is open to students 18 years of age or older, or who are high school graduates regardless of their academic ability. To earn the AAS degree students are required to take Math 50 or higher and Eng 21 or ESL 15 or higher. The certificate of achievement does not have these requirements.

**b. Information on external factors affecting the program;** None.

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

**d. Required external measures, if applicable (e.g.) Nursing Cert.** None.

**e. Analysis of data**

*The program is healthy. Data elements are reasonable compared to other programs in the same department and division.*

*Number of Majors:* The number of FTE student majors of 17.70 compared to the 25 unduplicated majors for the academic year appears reasonable. In fact it is the highest of any of the ATE programs as a percent of unduplicated majors (71%).

*Average Class Fit & Student- Faculty Ratio:* Class caps for the program are set at 20. ATE programs have class caps ranging from 14 to 20. The program's average class size is slightly more than 15 and average class fit averaged 77%. The student faculty ratio is 10.42.

*FTE Faculty:* The number of faculty assigned to the program is adequate. The FTE of BOR appointed program faculty is 1 and the number of FTE faculty based on contact hours is 1.19.

*GPA and Number of Graduates:* The program paid course (PPC) average GPA is 2.89 and the non-PPC average GPA is 3.45. The 11 DISL graduates is greater than the average number of graduates for the five programs in the Transportation & Applied Technology Department.

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

**Goals for 2007-08**

1. To promote and award the Caterpillar/Hawthorne Student Achievement Award at the high school and continuing student level
2. To develop a recruitment flyer featuring non traditional students and the Modular Diagnostic Information System being purchased with a Perkins mini grant.
3. To work with Hawthorne for donations of current diesel engines
4. To form a technical maintenance council: a group of industry people who will make classroom presentations and hold training workshops. The purpose will be to make sure students are exposed to current industry training and trends
5. To develop relationships with manufacturers nationwide
6. To review and update if necessary student learning outcomes
7. To develop assessment strategies for student learning outcomes
8. To request \$25,000 to replace and update equipment and tools
9. To attend the **Fuller Standard Transmission** summer training held on the mainland (\$3,000).

Total budget requested for equipment and professional development: \$28,000

**Data Chart**

**QUANTITATIVE TREND DATA CHART**

**Program Name: Transportation: Diesel Mechanics**

	<b>Fall 2005</b>	<b>Spring 2006</b>	<b>AY</b>
<b>#1 Number of Unduplicated Majors</b>	22	20	25
<b>#2 Total Student Semester Hours</b>	266	265	531

#3	FTE Student Majors	17.73	17.67	17.70
#4	Number of Graduates	-	-	11
#5	Number of classes	7	6	13
#6	Avg Class size	15.86	15.00	15.46
#7	Avg Class fit	79.3%	75.0%	77.3%
#8	FTE of BOR Appointed Program Faculty	-	-	1
#9	Number of FTE Faculty	-	-	1.19
#10	Student semester hours for all PPC class enrollments	190	182	372
#11	Student-Faculty Ratio	-	-	10.42
#12	PPC Credits Earned Ratio	.99	.93	.96
#13	Non-PPC Credits Earned Ratio	.85	.95	.90
#14	PPC Avg GPA	2.97	2.81	2.89
#15	Non-PPC Avg GPA	3.45	3.44	3.45
#16	Budget	-	-	5670.00
#17	Program Cost per SSH***	-	-	119.48

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



## **PROGRAM DESCRIPTION**

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

The Diesel Mechanics Program prepares the student for employment as a skilled trades person who maintains and repairs and also troubleshoots problems with engines, trucks, tractors, boats and other heavy equipment. Students gain knowledge and skills necessary for competent diagnosis, maintenance, modification, repair and servicing of diesel engines and power trains. Knowledge of support systems, electrical, fuel, cooling, air intake, and exhaust is also necessary. The Bacharach comparator and specialist 10-fuel pump calibrator is used for the fuel system.

Students troubleshoot electronic control systems used on heavy duty truck engines such as International, Caterpillar, Detroit and Cummins Diesel Engines using a modular diagnostic information system tool. They learn to use maintenance manuals, parts books, repair manuals, instruments and special tools and equipment common to the industry. They also learn fuel calibration specifications.

## **PROGRAM GOALS**

The specific goals of the program are:

1. To develop desirable work habits, solid background and knowledge, skill, and attitude to assure that graduates acquire the competencies required to succeed on the job.
2. To provide in-service training and job upgrading opportunities for professionals in the field of Diesel mechanics.
3. To educate students in the knowledge and skill that will enable them to understand and appreciate their heritage and to be aware of the contributions of different cultures;
4. To exercise good judgment as citizens and to instill a desire for lifelong learning that will enable them to respond to changing technology.

**PROGRAM HEALTH INDICATORS**

INDICES	MINIMUM LEVEL	ACTUAL LEVEL	SATISFACTORY LEVEL
<b>PROGRAM DEMAND/CENTRALITY: Fall 2006</b>			
Number of Applicants	12	16	15
Number of Majors	22	19	15
Student Semester Hours	144	192	180
Class Credit Hours	12	12	12
Number of Classes Taught	1	6	6
<b>PROGRAM EFFICIENCY: Fall 2006</b>			
Average Class Size	12	16	15
Student Semester Hours per FTE Faculty	144	192	180
Equiv. Class Credit Hours per FTE Faculty	12	12	12
Percentage of Small Classes	20%	0%	0%
<b>PROGRAM OUTCOMES: Fall 2005 (See Perkins III Core Indicators on Page 5)</b>			
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 Participation – Females		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	10	9	81.92%	90.00%
Vocational Skills	11	11	90.00%	100.00%
Degrees & Certificates	11	8	37.33%	72.73%
Placement/Employment	3	2	71.72%	66.67%
Retention/Employment	2	2	92.00%	100.00%
Nontraditional Participation	22	0	14.60%	0.00%
Nontraditional Completion	10	0	12.73%	0.00%

**OCCUPATIONAL DEMAND**  
**Hawai'i County - 1998-2011**

Occupational Title	State 2005	Hawaii County 2005	Hawaii County New 2005-2011	State Replacement 2005-2011	Hawaii County Replacement 2005-2011
Bus & truck mechanics and diesel engine specialists	1022	88	5	161	13
Marine tech maintenance & repair workers	8123	880	135	908	98
TOTAL					
Total demand 2005-2011 = 251					

**Source:** EMSI Table for Hawaii County

## **ANALYSIS OF THE PROGRAM**

### **Program Demand/Centrality**

Persons with the ability to repair diesel engines and heavy equipment/trucks are in demand. Currently the number of persons retiring each year exceeds the number of people entering the industry. Opportunities for entry level diesel repair technicians are available nationwide. The EMIS report indicates a need for the type of technicians trained by the Diesel Mechanics program.

The program meets or exceeds the satisfactory level for all program demand indicators. The number of applicants increased from the previous year while the number of majors decreased.

### **Program Efficiency**

The program meets or exceeds the satisfactory level for all program efficiency indicators. Average class size remained at 16, the same as the previous year. Student semester hours per full time equivalent faculty minimally decreased to 192 from 195.

### **Program Outcomes**

Data indicate that students have problems with General Education courses. The students that enroll in the program come from varied socio-economic backgrounds with financial problems and a wide range of academic preparedness. They are more responsive to vocational skills courses. Job placement is slightly below the desired level; however the size of the numerator (2) and denominator (3) are such that one student makes a material difference. Job retention rate is excellent. The program cannot meet the industry's need. We have more jobs than graduates.

### **Plan of Action 2005-2006**

1. Provide current, relevant curriculum and activities to prepare students for employment in diesel mechanics and heavy equipment mechanics.
2. To develop desirable work habits, solid backgrounds, knowledge, skills and attitudes to assure that graduates acquire the competence required to succeed on the job.
3. To provide equal educational opportunities to members of the community.
4. To educate students to understand and appreciate their heritage and to be aware of the contributions of different cultures, to exercise good judgment as citizens, and to instill a desire for lifelong learning that will enable them to respond to the ever-changing technology.

### **Identify how the program has responded to its Plan of Action**

The program's primary instructor retired December 2005. A new instructor was hired effective September 2005. The new instructor was mentored for the fall 2005 semester to insure a smooth transition. The program developed student learning outcomes and is developing a strategy for assessment to better insure students are prepared for the workplace. Approximately \$80,000 in equipment has been donated for the students to practice on. Arrangement with a local bus company also allows students to do "live" repairs. The program also has formed a partnership with Caterpillar/Hawthorne to provide two annual scholarships for DISL majors: one for a continuing student and one for a recent high school graduate.

### **Goals for 2007-08**

10. To promote and award the Caterpillar/Hawthorne Student Achievement Award at the high school and continuing student level
11. To seek funds to replace tools
12. To work with Hawthorne for donations of current diesel engines
13. To form a technical maintenance council: a group of industry people who will make classroom presentations and hold training workshops. The purpose will be to make sure students are exposed to current industry training and trends
14. To develop relationships with manufacturers nationwide
15. To review and update if necessary student learning outcomes
16. To develop assessment strategies for student learning outcomes
17. To request \$25,000 to replace and update equipment
18. To attend the **Fuller Standard Transmission** summer training held on the mainland (\$3,000).

## **Appendix A: History and Admission Requirements**

### **Program History**

The Diesel Mechanics Program (DIMCH) at what is now Hawai'i Community College began in 1947 under the Department of Education. The forerunner of the college was the Hawai'i Vocational School, established in 1941 by an act of the Territorial Legislature as a separately administered area vocational school. In 1947, the facility was located in the Banyan Drive area. Advancements in technology and the expansion of educational opportunities into broader areas of technical training brought about a new name, Hawai'i Technical School. At that time the sugar industry's needs created a demand for personnel to modify, repair and maintain diesel-powered field and road equipment. In addition, macadamia nut farms and the local charter fishing industry were increasing their utilization of diesel power. During this period, students were required to complete 2,600 hours of instruction to earn a Certificate of Achievement in a two-year period.

The school moved to a new location on Manono Street in 1959. Under the Enabling Act passed by the 1969 State Legislature, the administration of the school was transferred from the Department of Education to the University of Hawai'i at Hilo. It was renamed Hawai'i Community College in 1970 and the Diesel program had one full-time diesel mechanics instructor. Another instructor was added in 1975 when the enrollment reached 37. In July 1983, the new diesel mechanics building was completed at the "mauka" campus on Kawili Street. New and more modern equipment purchased at that time enabled the program to up-date instruction in accordance with the industry standard.

In the spring 1989, the program began to revise and modularize its courses to accommodate a larger and varied population and to offer a flexible education opportunity to students.

Summer of 1994 marked a new era for the program as a one-instructor program. Administration then requested a restructuring of DIMCH to operate under one instructor and to be able to accept students every fall. On the recommendation of the Advisory Committee that it would be more feasible to graduate a smaller class every spring as jobs are difficult due to the State's Economic problems. The program now offers an updated instruction in all areas that meets industries standards with guidance of the Advisory Committee. The Program now accepts students every semester.

### **Program Admission Requirements**

Admission is open to any high school graduate or person 18 years of age or older who can profit from the instruction offered. Students may transfer from other institutions of higher learning after proper application has been made and official transcript received and evaluated. Students are accepted on a "first-come, first-served" basis.

## Appendix B: Degree Requirements

<b>First Semester</b>		<b>CA</b>	<b>AAS</b>
DiMc 20	Intro to Diesel Engines	2	2
DiMc 21	Engine Operating Principles	2	2
DiMc 22	Cylinder Blocks & Heads	2	2
DiMc 23	Crankshaft & Bearings	2	2
DiMc 24	Camshaft, Gear Train, & Timing	2	2
DiMc 25	Piston & Connecting Rod Assemblies	2	2
** Math 50	Technical Math or higher	3	3
** Eng	Eng 21, 51, or 22 or higher	3	3
<b>TOTAL</b>		<b>18</b>	<b>18</b>
<b>Second Semester</b>			
DiMc 30	Intro to Electrical Systems	2	2
DiMc 31	Starting Systems & Circuits	1	1
DiMc 32	Charging Systems & Circuits	2	2
DiMc 33	Intro to Fuel Systems	2	2
DiMc 34	Caterpillar Fuel Systems	1	1
DiMc 35	Detroit Fuel Systems	1	1
DiMc 36	Cummins Fuel Systems	1	1
DiMc 37	Stanadyne Fuel Systems	1	1
DiMc 38	Bosch-CAV	1	1
Elective	Social, Natural, & Cultural Env. (Phys 50 or higher recommended)		6
<b>TOTAL</b>		<b>12</b>	<b>18</b>
<b>Third Semester</b>			
DiMc 40	Intro to Power Trains	3	3
DiMc 41	Clutches & Flywheels	1	1
DiMc 42	Mechanical Transmissions	1	1
DiMc 43	Drive Lines & Power Take-Offs	2	2
DiMc 44	Differentials & Final Drives	2	2
DiMc 45	Torque Converters & Hydraulic Assist Transmissions	2	2
DiMc 46	Hydrostatics	1	1
Elective	Social, Natural, & Cultural Env. (SpCom 51 or higher rec.)		3
<b>TOTAL</b>		<b>12</b>	<b>15</b>
<b>Fourth Semester</b>			
DiMc 50	Brakes		2
DiMc 51	Suspension & Steering		2
DiMc 52	Engine Lub. & Lub. Systems		2
DiMc 53	Engine Coolants & Cooling Systems		2
DiMc 54	Air Intake & Exhaust Systems		2

DiMc 55	Hydraulics/Pneumatics		3
DiMc 93V	CVE (optional)		
	<b>TOTAL</b>		<b>13</b>
	<b>TOTAL</b>	<b>42</b>	<b>64</b>

**Appendix C: Faculty**

**Regular Faculty**

<b><u>Name</u></b>	<b><u>Tenure Status and date</u></b>	<b><u>Degrees Held</u></b>	<b><u>Rank</u></b>
Mitchell Soares C-2	Instructor, 2006		

**Part-time Faculty**

<b><u>Name</u></b>	<b><u>Tenure Status and date</u></b>	<b><u>Degrees Held</u></b>	<b><u>Rank</u></b>
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**Appendix D: Advisory Committee**

Sam Gray, Owner, Precision Fuel Injection, Inc.  
Eugene Lyman, Equipment Supervisor, A & B Fleet  
Dennis Rose, Owner, Power Generation Services  
Kelvin Kohatsu, Fleet Manager, HELCO  
Kimo Padello, Hawthorne Pacific

## **Appendix E: Definitions of Data Elements (All data includes West Hawai'i)**

### **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. Equivalent Class Credit Hours per FTE Faculty: Total class credit hours from A.4. divided by total analytical FTE Faculty.
4. Percentage of Small Classes: 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. Credits Earned Ratio (Remedial/Developmental): 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. Credits Earned Ratio (General Education): 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. Credits Earned Ratio (Vocational Education): 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. Credits Earned Ratio (Overall): Combination of C.1., C.2., and C.3. above.
5. Graduate Placement Rate: Students who graduated with a certificate/degree in the PAST academic year and found work in that field. The following firms consider the Diesel Mechanics Program as their primary source in hiring mechanics:
  - Hawthorne Pacific (Kona & Hilo)
  - Allied Machinery
  - Jas W. Glover Ltd.
  - Yamada & Sons Inc.
  - Precision Fuel Injection, Inc.
6. Degrees Awarded: The number of certificates and degrees awarded during the PAST academic year.

7. Retention Rate: New students within a program/major continuing or retained in that program/major from the past two or more terms.