# HAWAI`I COMMUNITY COLLEGE
# PROGRAM REVIEW REPORT

# DIESEL MECHANICS TECHNOLOGY

## November 26, 2008

### Assessment Period: July 1, 2005 to June 30, 2008

**Initiator:**
**Clyde Kojiro**
**Writer(s):**
**Mitchell Soares**

***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**

# Diesel Mechanics

**2007-2008**

## A. Program Effectiveness

1. Write a brief narrative describing the program and how it supports the College's mission and imperatives.

   The Diesel Mechanics Program consists of 28 different one (1) to three (3) credit modules. Courses are offered over a two year cycle with students being accepted any semester. In addition to the 64-credit A.A.S. degree, the program also has a 36-credit Certificate of Achievement.

   The Diesel Mechanics Program supports the mission and imperatives of the College with a mission to prepare students to be valued trades people who have the knowledge and skills necessary to effectively troubleshoot, maintain, and/or repair diesel engines, trucks, tractors, boats, and/or other heavy equipment.

   Attach a current Program Map as **Appendix A**.

2. Attach the program's current Assessment Plan as **Appendix B**.

3. As a result of a review of program courses and curricula, (summarize) what changes have been made and why?

   As a result of industry indicating the need for workers to have knowledge about electronics and air conditioning, electronics for diesel engines and air conditioning for diesel equipment were integrated into courses within the program.

| Plan of Action 2007-2008 | Status |
|---|---|
| 1. Award the Hawthorne Caterpillar scholarships again for the 2008-09 academic year. | Two $2,500 awards were given. |
| 2. Further develop a relationship between Joe Schaffer, Palomar College, and the HawaiiCC Deisel Program. This will include investigating whether Mr. Schaffer would like to lecture three credits for HawaiiCC spring or fall 2008. | ongoing<br>Mr. Schaffer will provide assistance to the Diesel Program fall 2008 |
| 3. Get the C-13 engine being contributed by Hawthorne running so students can experience a more modern diesel engine than those currently available in the lab. | in progress |

| | |
|---|---|
| 4. Support Guam Community College in their development of a diesel program; this relationship is being developed at the request of Hawthorne Pacific Corp., a strong support of Hawai‘i CC’s diesel program. | no action |
| 5. Have an outside person assess randomly selected students performing an actual work project. | no action |
| 6. Work with Helen Nishimoto to survey employers of recent graduates to determine their assessment of the students’ skills and work ethics. | no action |
| 7. Continue to look for ways to replace outdated equipment. | ongoing |
| 8. Determine if class caps can be lowered to improve safety and working conditions in the classroom | in progress |

4. Program Strengths and Weaknesses

Briefly describe the program’s strengths and weaknesses to include: 1) an analysis of data elements (see **Table 5)**--demand, efficiency, and effectiveness; 2) perceptions of the program’s progress on assessment of Program Learning Outcomes (PLO’s); 3) and any other pertinent information.

- The overall program health is Cautionary. Demand based on new and replacement positions in the county is weak showing only 4 positions available. The number of majors in fall 2007 is 33, which is significantly higher than demand presenting an Unhealthy assessment. Strong industry support suggests a higher demand for qualified diesel mechanics than is indicated by the county statistics.

- All the statistics used to determine efficiency increased favorably for the current period. Although the efficiency of the program is deemed Healthy, with one instructor and a fill rate of 110.71% and a ratio of majors/FTE BOR Appointed Faculty of 33, it is a concern as to whether safety and working conditions are being compromised.

- The persistence from fall to spring is 72.73% which falls at the Cautionary level and this is a decrease of 10.6% from 2006. More alarming is the data that only 3 degrees and 1 certificate were earned. With only one instructor and an open entry structure where students are being accepted any semester, it is extremely important to know the level at which the student is at.

**Program Strengths (S1, etc.) and Weaknesses (W1, etc.)**

Enumerate, do not rank, the top strengths and the worst weaknesses (3 each is recommended).

**S1…Partnerships with Caterpillar/Hawthorne and other industry partners.**

**S2…Strong community support and willingness to accommodate program, instructor, and students for on site demos, tours, and field trips.**

**S3…Progressive modular curriculum that was updated in 2000.**
**W1…Program is taught by one instructor and each class has students with a variety of skill levels.**
**W2…Teaching students with antiquated equipment and tools (i.e. engines and transmissions).**
**W3…Lack of assistance for instructor especially since diesel classroom is a far distance from the ATE Division Office**

**Program Student Learning Outcomes:**

- **Function safely in a heavy equipment shop environment.**
- **Demonstrate ability to communicate effectively to gather and convey information.**
- **Apply theory and principles for proper diagnosis, repair, and maintenance in the heavy-duty truck equipment industry.**
- **Practice the minimum essential mental, physical, and behavioral skills necessary to maintain professional proficiency.**
- **Work collaboratively with others as well as independently.**

### B. Action Plan for Program Improvement

**Complete Tables 1-4 and provide justification for program budget requests:**

**Table 1—Top 6 Non-Cost Items** (add rows as needed; examples given)

| **Task:** | **Academic yr.** | **Who is responsible** | **Best Fits which ADP Goal*** | **Addresses which strength or weakness** |
|---|---|---|---|---|
| 1. To promote and award the Caterpillar/Hawthorne Student Achievement Award at the high school and continuing student level | Spring 2009 | Program Coord. | B | S1 |
| 2. To develop a recruitment flyer featuring non traditional students and the Modular Diagnostic Information System | Spring 2009 | Program Coord. | B | S3 |
| 3.To work with Hawthorne for donations of current diesel engines | 2008-2009 | Program Coord. | A,E | S1, W2 |
| 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 | 2009-2010 | Program Coord. | A,C,E | S2, W2 |
| 5. To develop relationships with manufacturers nationwide | 2008-2009 | Program Coord. | E | S2, W2 |
| 6. To review and update student learning outcomes | 2008-2009 | Program Coord. | A,C | S3 |
| 7. To develop assessment strategies for student learning outcomes | 2008-2011 | Program Coord. | A,C | S3 |

**Key to abbreviations:**

***ADP Goal s are: A, B, C, D, E**

**Strengths/Weaknesses are numbered (S1, S2… W1, W2…--from A.4.)**

**Table 2 —Top 6 Cost Items** (add rows as needed; examples given)

| **Task:** | **Academic Yr.** | **Who is responsible** | **$ amount & budget category Except R/M** | **Best fits which ADPGoal*** | **Addresses which strength or weakness** |
|---|---|---|---|---|---|
| 1.hire 1 lecturer to teach 3-6 credits per semester | 2009-10 | Program Coord. | $15K, P | A | W1, S3 |
| 2. hire 1 student lab assistant | 2009-10 | Program Coord. | $5K, P | A,E | W1, S3 |
| 3. purchase updated engine for students to work on | 2009-10 | Program Coord. | $10K, E | A,C,E | W2 |
| 4. purchase updated transmissions: 13-18 speed | 2009-10 | Program Coord. | $20K, E | A,C,E | W2 |
| 5. purchase big storage tool box | 2009-10 | Program Coord. | $12K, E | A,C,E | W2 |
| 6. purchase drill presses | 2009-10 | Program Coord. | $5K, E | A,C,E | W2 |
| 7. purchase big bench grinder | 2009-10 | Program Coord. | $2.5K, E | A,C,E | W2 |
| 8. purchase wire feed welder | 2009-10 | Program Coord. | $5K, E | A,C,E | W2 |
| 9. purchase pressure washer | 2009-10 | Program Coord. | $5K, E | A,C,E | S3 |
| 10. purchase sand blaster | 2009-10 | Program Coord. | $6K, E | A,C,E | W2 |
| 11. purchase copy machine | 2009-10 | Program Coord. | $1.5K, E | E | W3 |
| 12. purchase fax machine | 2009-10 | Program Coord. | $500, E | E | W3 |
| 13. install crane | 2009-10 | Program Coord. | $10K, installation | A,C,E | W2 |
| 14.Increase supply budget | 2009-10 | Program Coord. | $8K, SE | C,E | S3 |
| 15. Repair and/or replace window blinds | 2009-10 | Program Coord. | $6 | E | S3, W1 |

**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.4)**

**Table 3.--Repair and Maintenance**

| Nature of Problem | Describe Location: e.g. Building(s) & Room(s) |
|---|---|
| Repair and maintenance of 5ton overhead crane | Upper Campus, Building 323 |
| Service/Repair Air Compressor | Upper Campus, Building 323 |
| Service/Repair Roll-Up Doors | Upper Campus, Building 323 |
| Maintain Crane (to be installed) | Upper Campus, Building 323 |

**Table 4—Equipment Depreciation, if applicable** (add rows as needed; examples given)

| 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 |
|---|---|---|---|
| Overhead Crane | E | 2009 | 12,000 |
| Air Compressors | CP | 2009 | 18,000 |
| Fork lift | E | 2010 | 20,000 |
| Chevy Blazer | E | 2011 | 32,000 |
| Military Truck | E | 2012 | 30,000 |
| Jacks, Jack Stands, & Lifting Straps | CP | 2010 | 15,000 |
| Dynamometer Room | E | 2011 | 45,000 |
| Air Conditioning Unit | E | 2011 | 8,000 |
| Diesel Engine Components | CP | 2009 | 5,000 |
| Video Camera & Digital Camere | CP | 2010 | 3,500 |

**Key to abbreviations:**
**CP=Controlled Property w/item value $1K-$5K**
**E=equipment w/item value >$5K;**

**C. Table 5—Data Elements**

# Annual Report of Program Data for Diesel Mechanics
## HAW CC Program Major(s): DISL

| | Demand Indicators | Fall of Year 2005 | 2006 | 2007 |
|---|---|---|---|---|
| 1 | New & Replacement Positions (State) | 30 | 30 | 38 |
| 2 | New & Replacement Positions (County) | 3 | 3 | 4 |
| | | | | |
| 3 | Number of Majors | 21 | 18 | 33 |
| | | | | |
| 4 | SSH Program Majors in Program Classes | 195 | 192 | 267 |
| 5 | SSH Non-Majors in Program Classes | 0 | 0 | 0 |
| 6 | SSH in All Program Classes | 195 | 192 | 267 |
| | | | | |
| 7 | FTE Enrollment in Program Classes | 13.00 | 12.80 | 17.80 |
| | | | | |
| 8 | Number of Sections Taught | 7 | 6 | 7 |

**Demand Health**
Unhealthy

| | Efficiency Indicators | Fall of Year 2005 | 2006 | 2007 |
|---|---|---|---|---|
| 10 | Average Class Size | 16.14 | 16.00 | 22.14 |
| 11 | Fill Rate | 80.71 | 80.00 | 110.71 |
| | | | | |
| 12 | FTE BOR Appointed Faculty | 1.00 | 1.00 | 1.00 |
| 13 | Majors / FTE BOR Appointed Faculty | 21.00 | 18.00 | 33.00 |
| 14 | Majors / Analytic FTE Faculty | 26.25 | 22.50 | 41.25 |
| 14a | Majors / Analytic FTE Faculty @ 12 cr. | 21.00 | 18.46 | 33.00 |
| 15 | Program Budget Allocation ('07 @ 12cr.) | $43,594.00 | $43,176.00 | $54,462.00 |
| 16 | Cost per SSH ('07 @ 12cr.) | $223.56 | $224.88 | $203.98 |
| | | | | |
| 17 | Number of Low-Enrolled (<10) Sections | 0 | 0 | 0 |

**Efficiency Health**
Healthy

| | Effectiveness Indicators | 2005 | 2006 | 2007 |
|---|---|---|---|---|
| 19 | Persistence (Fall to Spring) | 80.95 | 83.33 | 72.73 |
| | | | | |
| 20a | Number of Degrees Earned (Annual)* | 4 | 9 | 3 |
| 20b | Number of Certificates of Achievement Earned (Annual)* | 6 | 8 | 1 |
| 21 | Number Transferring (to UHM, UHH, UHWO) | 0 | 0 | 0 |
| | Perkins - Campus Actual ** | | | |
| 22 | 1P1 Academic Achievement | 71.43 | 90 | 50 |
| 23 | 1P2 Vocational Achievement | 87.5 | 100 | 100 |
| 24 | 2P1 Completion | 37.5 | 72.73 | 33.33 |
| 25 | 3P1 Placement Employment/Education | 77.78 | 66.67 | 75 |
| 26 | 3P2 Retention Employment | 71.43 | 100 | 100 |
| 27 | 4P1 Non Traditional Participation | 4.17 | 0 | 5 |
| 28 | 4P2 Non Traditional Completion | 0 | 0 | 0 |
| | Perkins - State Standards ** | | | |
| 22 | 1P1 Academic Achievement | 81.81 | 81.92 | 81.87 |
| 23 | 1P2 Vocational Achievement | 90.00 | 90.00 | 90.42 |
| 24 | 2P1 Completion | 36.00 | 37.33 | 38.17 |
| 25 | 3P1 Placement Employment/Education | 71.00 | 71.72 | 71.07 |
| 26 | 3P2 Retention Employment | 90.00 | 92.00 | 92.00 |
| 27 | 4P1 Non Traditional Participation | 14.81 | 14.60 | 14.60 |
| 28 | 4P2 Non Traditional Completion | 12.86 | 12.73 | 12.19 |
| 29 | Faculty FTE Workload @ 12 cr. | 1 | 0.98 | 1 |

**Effectiveness Health**
Cautionary

| | |
|---|---|
| Overall Program Health | Cautionary |


| | |
|---|---|
| Overall Program Health | Cautionary |

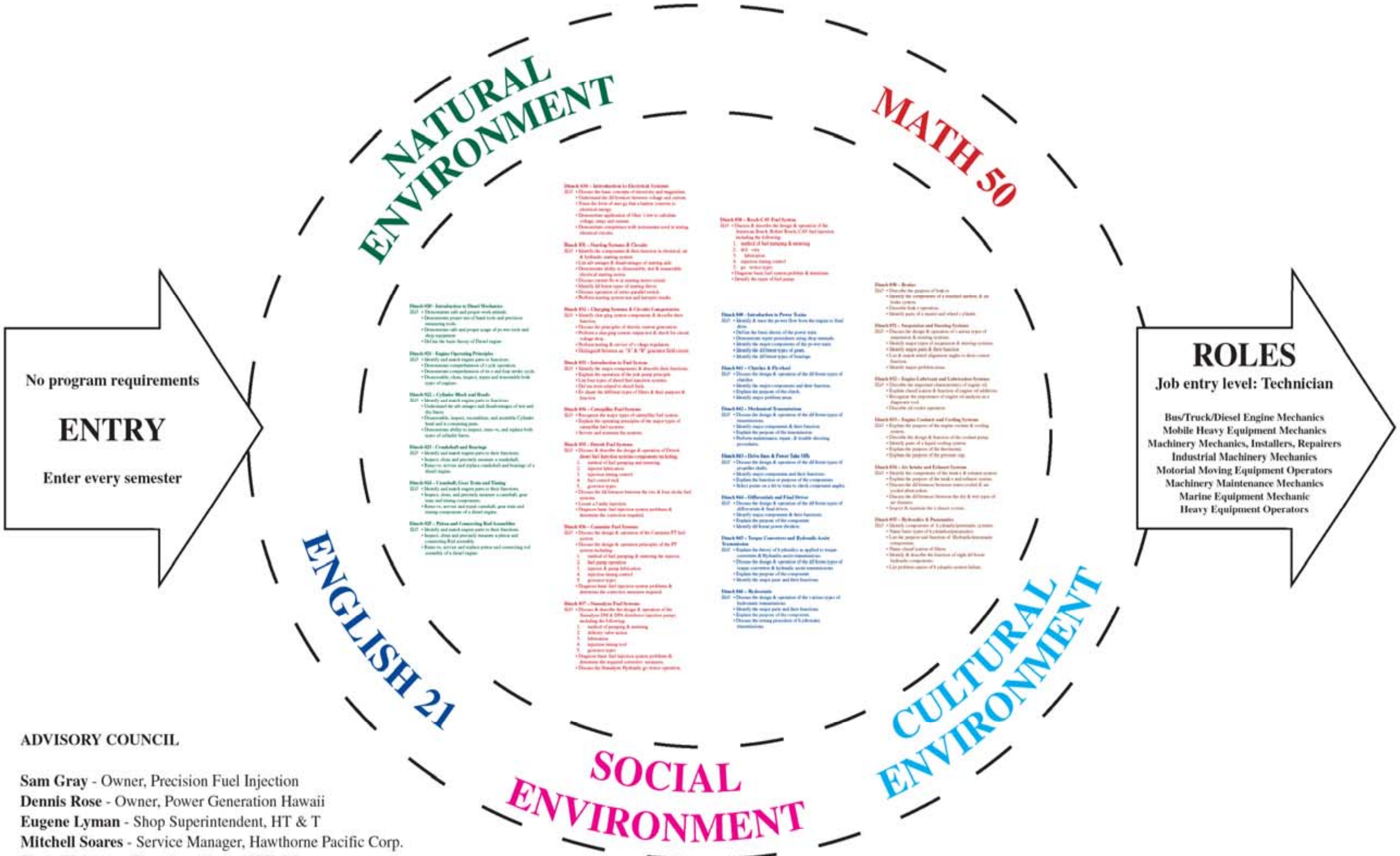

*All degrees and certificates are counted based on fiscal year.

** Perkins data are for CTE programs only. From report on 2006-2007 Perkins activity year

**Program Map -- Appendix A**

# Hawai‘i Community College

# DIESEL MECHANICS




**Intended Learning Outcomes**

- 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.
- To educate students in the knowledge and skill that will enable them to understand and appreciate their heritage and to be aware of contributions of different cultures.
- To exercise good judgment as citizens and to instill a desire for a lifelong learning that will enable them to respond to changing technology.
- Practice all appropriate safety precautions on the job protect yourself, equipment and the environment
- Communicate clearly with team members and customers
- Establish respectable relationship with clients
- Conduct yourself on the job with a high degree of professionalism
- Use service literature and tools efficiently
- Practice a systematic diagnostic and repair strategy
- Understand the operational systems theory for modern diesel equipment and heavy trucks
- Diagnose electrical and computer controlled malfunctions

ADVISORY COUNCIL

**Sam Gray** - Owner, Precision Fuel Injection
**Dennis Rose** - Owner, Power Generation Hawaii
**Eugene Lyman** - Shop Superintendent, HT & T
**Mitchell Soares** - Service Manager, Hawthorne Pacific Corp.
**Kevin Kohatsu** - Fleet Coordinator, HELCO

Hawai‘i Community College

**Appendix B**
**Program Assessment Plan**

**Hawai‘i Community College**
**Instructional Program Assessment Plan For Learning Outcomes**
**Associate in Applied Science – Diesel Mechanics (DISL)**
**Submitted by: Mitchell Soares, (August 15, 2008)**

**Semester: Fall 2008**

**Student Learning Outcome (program level) for Assessment* (taken from Appendix):**

**SLO #3 Apply theory and principles for proper diagnosis, repair, and maintenance in the heavy-duty truck equipment industry.**

**Step 1. Identify the artifact(s) (i.e., student work) for assessment and course(s) from which selected:**

| |
|---|
| Name/Description of artifact: **Written test containing ASE style questions** |
| |
| |
| |

**Step 2. Develop the assessment tool (e.g., rubric) to be used with 3 levels of assessment, if applicable—Level 1=does not meet expectations; Level 2=meets expectations; Level 3=exceeds expectations. Attach the assessment tool.**

**Step 3. Set the Performance Rate:**

**90% of the artifacts assessed by the Assessment Team will have correctly answered 70% of the questions.**

**Step 4. Describe the method used to collect the artifacts:**

| |
|---|
| Where or from whom artifacts will be collected: **Third & Fourth Year Students enrolled in fall 2008 Diesel courses** |
| When will artifacts be collected: **Fall 2008 to be assessed Spring 2009** |

**Step 5. Describe the sampling method used to collect the data:**

| |
|---|
| (assessment need to be done immediately) **Third & Fourth Year Students enrolled in fall 2008 Diesel courses will take an exam consisting of ASE style questions. 80% of the exams will be randomly selected for assessment by the Assessment Team to provide evidence of the intended outcome.** |

**Step 6. Describe the composition of the Assessment Team (AT) (add more rows as needed):**

| |
|---|
| Evaluator(s): |
| **1 Advisory Committee member or someone from industry** |
| **2 Advisory Committee member or someone from industry** |
| **3 Faculty member from ABRP or MWIM** |

**Step 7. The Assessment Team uses the assessment tool(s) (e.g., rubric) to evaluate the data.**

**Step 8. The Program will summarize and interpret the results, and determine the implications for program improvement. Note: a summary will be included in the comprehensive program review.**

*note: one form will be submitted for each student learning outcome that is assessed

Assessment Plan to be sent electronically to the Vice Chancellor for Academic Affairs for posting on the internet

**Student Learning Outcomes (program level) (add more rows as needed):**

1. **Function safely in a heavy equipment shop environment.**
2. **Demonstrate ability to communicate effectively to gather and convey information.**
3. **Apply theory and principles for proper diagnosis, repair, and maintenance in the heavy-duty truck equipment industry.**
4. **Practice the minimum essential mental, physical, and behavioral skills necessary to maintain professional proficiency.**
5. **Work collaboratively with others as well as independently.**

| | | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| DiMc 20 | Introduction to Diesel Engines | X | X | | X | X |
| DiMc 21 | Engine Operating Principles | X | X | | | |
| DiMc 22 | Cylinder Blocks & Heads | X | | X | | |
| DiMc 23 | Crankshaft & Bearings | X | | X | | |
| DiMc 24 | Camshaft, GearTrain and Timing | X | | X | | |
| DiMc 25 | Piston & Connecting Rod Assemblies | X | | X | | |
| DiMc 30 | Introduction to Electrical Systems | X | X | | X | X |
| DiMc 31 | Starting Systems & Circuits | X | | X | | |
| DiMc 32 | Charging Systems & Circuits | X | | X | | |
| DiMc 33 | Introduction to Fuel Systems | X | X | | X | X |
| DiMc 34 | Caterpillar Fuel Systems | X | | X | | |
| DiMc 35 | Detroit Fuel systems | X | | X | | |
| DiMc 36 | Cummins Fuel Systems | X | | X | | |
| DiMc 37 | Stanadyne Fuel Systems | X | | X | | |
| DiMc 38 | BOSCH-CAV | X | | X | | |
| DiMc 40 | Introduction to PowerTrains | X | X | | X | X |
| DiMc 41 | Clutches & Flywheels | X | | X | | |
| DiMc 42 | Mechanical Transmissions | X | | X | | |
| DiMc 43 | Drive Lines & Poer Take-offs | X | | X | | |
| DiMc 44 | Differentials & Final Drives | X | | X | | |
| DiMc 45 | Torque Converters & Hydraulic Assist Transmissions | X | | | | |
| DiMc 46 | Hydrostatics | X | | | | |
| DiMc 50 | Brakes | X | X | X | X | X |
| DiMc 51 | Suspension & Steering | X | | X | | |
| DiMc 52 | Engine Lubricant & Lubrication Systems | X | | X | | |
| DiMc 53 | Engine Coolants & Cooling Systems | X | | X | | |
| DiMc 54 | Air Intake & Exhaust systems | X | | X | | |
| DiMc 55 | Hydraulics/Pneumatics | X | | X | | |

**Student Learning Outcomes (program level) to be assessed for each year of the program review cycle. Identify the learning outcomes by number only taken from above**

<table>
<tr><th colspan="2">Fall semester</th><th></th><th colspan="2">Spring semester</th></tr>
<tr><td colspan="2">Year 1 (2008/09) SLO #3</td><td></td><td colspan="2">SLO #1</td></tr>
<tr><td>Year 2 (2009/2010) SLO #2</td><td>SLO #4</td><td></td><td>SLO #5</td><td></td></tr>
</table>

| A.A.S. Diesel Mechanics | | |
|---|---|---|
| **Fall 2008 Final Exam** | | |
| **Intended Learning Outcome: Understand the operational systems theory for modern diesel equipment and heavy duty trucks.** | | |
| **Fail** | **Approaching** | **Pass** |
| **<60%** | **60%-69%** | **70%+** |
| **Demonstrated a complete lack of understanding of subject matter.** | **Demonstrated insufficient understanding of subject matter.** | **Demonstrated adequate knowledge of subject matter.** |

| | **Check (✓) one** | | |
|---|---|---|---|
| | Fail | Approaching | Pass |
| Artifact #1 | | | |
| Artifact #2 | | | |
| Artifact #3 | | | |
| Artifact #4 | | | |
| Artifact #5 | | | |
| Artifact #6 | | | |
| Artifact #7 | | | |
| Artifact #8 | | | |
| Artifact #9 | | | |
| Artifact #10 | | | |
| Artifact #11 | | | |
| Artifact #12 | | | |
| Artifact #13 | | | |
| Artifact #14 | | | |
| Artifact #15 | | | |
| Artifact #16 | | | |
| Artifact #17 | | | |
| Artifact #18 | | | |
| Artifact #19 | | | |
| Artifact #20 | | | |
| Artifact #21 | | | |
| Artifact #22 | | | |
| Artifact #23 | | | |
| Artifact #24 | | | |
| Total | | | |
| Percentage | | | |

**Refer to Spreadsheet**

**Comments and Recommendations:**

**Assessment by _____________________________________________ Date __________________**