Diesel Service Technology Program Review 2014
Portland Community College
Diesel Service Technology Program Overview

The Diesel Service Technology program at PCC offers the community comprehensive, technical training in the repair and maintenance of on and off-road diesel powered equipment. Our primary focus is heavy duty trucks used in the transportation industry. Students receive instruction regarding the different systems that heavy duty trucks are comprised of including diesel engines, drive trains, hydraulics, electrical and electronic systems, chassis and braking systems, and pneumatics.

The objectives of the Diesel Service Technology Program at PCC are to prepare our graduates to enter into industry employment with the skills and knowledge to perform entry level work, or to further their education by transferring to a 4 year college that offers an advanced degree in Diesel Technology. To accomplish these objectives we earned and have maintained National Automotive Training Education Foundation (NATEF) certification. NATEF is a private, nonprofit organization dedicated to improving the quality of technician training programs nationwide. We are one of only 88 post-secondary colleges in the nation to be certified and the only NATEF certified Diesel program in the state of Oregon. NATEF recertification takes place every 5 years, with a mid-term review every 2 ½ years. Last spring we passed our mid-term review and will be undergoing a complete recertification in August of 2015. To remain certified, we must maintain our program according to their strict guidelines concerning the training of our students, the equipment we use, our safety standards, our facilities and the qualifications of our instructors.

Toward accomplishing our objective of preparing our graduates for higher education, we worked with the college to implement an articulation agreement with Montana State University Northern (MSUN); our graduates can apply their credits directly to MSUN’s BS program and enter the university as a junior. We are also working closely with Centralia College in Centralia, WA to develop their BS program. In the near future, our students will have the opportunity to complete an advanced degree closer to home.

The Diesel Service program maintains close relationships with regional employers; representatives from 36 different repair shops, dealerships and municipal agencies are members of our advisory board and provide valuable input. We offer students the opportunity to take night courses each term, and we work with such organizations as the National Guard to provide summer training courses. We are an affiliate of the Eaton Corporation and Bobcat Equipment Company, providing facilities and training aides free of charge in exchange for instructor training and the most advanced components and equipment they have in their inventories. Bobcat provides skid-steer machines for our hydraulics and fuels courses, and Eaton has generously donated automated transmissions that are the most advanced in the industry.
1. Program/Discipline Overview:

A. What are the educational goals or objectives of this program/discipline?

The objectives of the Diesel Service Technology Program at PCC are to prepare our graduates to enter into industry employment with the skills and knowledge to perform entry level work, or to further their education by transferring to a 4 year college that offers an advanced degree in Diesel Technology.

We believe that certain fundamental values direct the course of our program, influence our decisions and focus our purpose. As a program, we value and strive:

- To provide and maintain quality instruction and equipment that represent current industry standards.
- To advise and assist students towards completion of their academic and career goals.
- To bring awareness to the public regarding the scope and economic effects of the Diesel Industry.
- To provide a safe and hostile free learning environment.
- To respect the dignity and worth of each individual.
- To maximize the efficiency of public funds and allocate them as intended.

How do these compare with national or professional program/discipline trends or guidelines?

Most diesel service programs nationwide have as their guiding principle the intent to produce graduates who can perform entry level tasks when they begin working in the industry. However, very few have it as a stated outcome to prepare graduates for further education. We believe the option is important for those graduates who want to advance their careers and we encourage and guide those interested to the institutions with which we have articulation agreements.

We understand by personal experience the value of an advanced degree in this industry. Graduates from 4 year programs can command starting salaries of up to $60,000 or more. The market for BS diesel graduates – although not as broad as that for certified or AAS diesel graduates – is one that is terribly underserved by higher education.

Have they changed since the last review, or are they expected to change in the next five years?

No, neither our goals nor our objectives have changed since the last review. We have updated our outcomes to more closely reflect the language and spirit of the college core outcomes. There are no plans to change our objectives in the near future, but we are aware that as the industry evolves we will need to evolve with it. Our goals are always open to reasonable changes.
B. Please summarize changes that have been made since the last review.

Since our last review, we have made the following changes:

- We recertified as a NATEF (National Automotive Training Education Foundation) Medium/Heavy Duty Truck program and passed our mid-term NATEF review.
- Implemented the ASE (Automotive Service Excellence) Student Certification exam program. This program serves as an exit exam and dovetails nicely with our NATEF certification (which is affiliated with ASE). The program has generated considerable excitement among our student body and advisory committee members. All students must take the exams; however passing is not a graduation requirement. The ASE Student Certification program exams provide a detailed evaluation of each student’s strengths and weaknesses. The data from the exams provide us with a good picture of the related curriculum, allowing us to identify areas that we need to change.
- Implemented entry level math, reading and writing requirements.
- Added a diesel only GS209 Job Finding Skills course to our credit requirements. The course can more closely focus on the needs of our students and provide local employers the opportunity to preview our future graduates by participating directly in mock interviews.
- Worked with the college to finalize an articulation agreement with Montana State University Northern. We currently have 3 AAS graduates completing their BS degree at the MSUN campus in Havre, Montana.
- Changed and updated the outcomes for our certificates and degrees.
- Changed and updated the outcomes and course descriptions for all courses offered.
- Began in-house industry instruction programs for Bobcat, and the National Guard. These courses cover fuel injection systems, current exhaust emissions technology and electronic transmission rebuild and diagnostics.
- Adjusted the credit hours for our Preventative Maintenance Inspection course (DS106) & our Brakes and Suspension Systems course (DS206) courses. DS106 is now a 4 credit course, DS206 is now an 8 credit course. DS106 covers PMI (Preventative Maintenance Inspections) and electronic diesel engine tune-up. DS206 covers on-road braking, steering and suspension systems.
- Replaced the tabletop lockers we were using as shop workspace with custom designed benches. The new benches were manufactured by a local machine shop to our specifications.
- Installed a new mezzanine in our lab to use as heavy-duty storage, thereby freeing up valuable lab space.
- Incorporated two newer Freightliner on-road trucks into our curriculum. Both were generously donated by the local Freightliner dealership.
- Received as donations two Generation 3 automated manual transmissions. We are currently integrating these as training aides for the power train courses.
- Upgraded three of our four classrooms with SMART technology and podiums, and re-organized the classrooms for a better student and instructor experience.
- We also submitted changes to the Degrees and Certificates Committee regarding the implementation of program prerequisites. These are as follows:
  1. Completion of RD80 or higher or equivalent placement test score. This prerequisite was determined by having samples of current machine service manuals evaluated for reading level. It was determined that the minimum reading competency level was 10th grade and that RD80 was best suited as an entry point.
2. Completion of MTH20 or higher or equivalent placement test score or successful completion of the Diesel Service Technology Math Entrance Exam. This prerequisite was determined by submitting math and math related samples of our curriculum to the math department. They recommended MTH20. To confirm their findings, the Diesel Service Technology Math Entrance Exam was developed by the SAC, submitted to the math department for evaluation then given to the entire Diesel student body as a test survey. See Appendix 3 for test survey details.
C. Were any of the changes made as a result of the last review? If so, please describe the rationale and result.

From the 2009 Program Review Administrative Response:
“Degree and Certificate outcomes: DST noted that degree & certificate outcomes had been completed. If so, they must be submitted to the Curriculum Office (as a program revision). There are guidelines on the Curriculum Office website http://www.pcc.edu/resources/academic/eac/degree/dc-outcomes-guidelines.html and/or help in refining outcomes from Sally Earl in the Curriculum office.
Course Outcomes: It was clear from your presentation and discussions (and implicit in ASE/NATEF certification) that your courses are very outcomes/competencies based. The course outcomes as listed in your CCOG’s however, do not fully reflect your competencies based approach, and need some tweaking. Accreditation based guidelines have shifted over time, with a growing emphasis towards more specific outcomes language. We don’t believe that revising your outcomes will be particularly difficult or time consuming, but it does need to be done. (Again, guidelines are on the Curriculum Office website and Sally will help.)”

All degree and certificate outcomes were revised and submitted in late 2012 according to the criteria available from the Curriculum Office. In addition, all course outcomes were similarly revised and submitted. The CCOG’s were edited to reflect the changes as well as to clean up language. See Appendix 1 & 2 for details on both the program and course outcome changes.
2. Outcomes and Assessment: reflect on learning outcomes and assessment, teaching methodologies, and content in order to improve the quality of teaching, learning and student success.

A. Course-Level Outcomes: Identify and give examples of assessment-driven changes made to improve attainment of course-level student learning outcomes. Where key sequences exist, also include information about assessment-driven changes to those sequences.

New lab assignments and lab sheets have been developed to help students achieve learning outcomes. Prerequisites in reading and math have been implemented for all classes to ensure that the students will be more likely to achieve the learning outcomes. Industry DVD learning programs have been acquired and are presented on D2L. Students have access to these programs and are required to complete them as part of their course requirements.

Since the last program review, we have developed and implemented 3 assessment techniques.

Safety and work ethic assessment:
All of our courses have some element of safety as an outcome. We both teach and enforce our lab safety rules while simultaneously recording and grading student behavior. The Safety and Work Ethic Assessment enabled us to standardize this element of our curriculum and is producing consistent information on our student’s achievement of safety related outcomes. We have completed two assessments (spring 2012 & spring 2013) and have observed a decrease in observed safety violations from 81 in 2012 to 22 in 2013. This is most likely due to more consistent enforcement by the instructors. The department safety standards are adopted directly from industry and include – but are not limited to – such things as the use of eye protection, work shoes, coveralls, personal and specialty tools, equipment operation, “lock-out/tag-out” procedures and general shop hazards. Each instructor is responsible for recording violations. Work ethic violations include – but are not limited to – such things as disruptive and abusive behavior, use of class time for other things, attendance, participating in general shop clean-up and respect for others.

ASE Student Certification exams:
Since the majority of our outcomes are competency based, it made sense to use a competency based assessment. The ASE Student Certification is a perfect complement to our NATEF certification: the exam questions are designed to test the same NATEF tasks we are certified to teach. We have gone through one testing cycle so far, and are excited about the potential. We’ve identified at least 7 potential problem areas, but have decided to wait for at least one more testing cycle before making changes. The changes we are contemplating concern general shop practices, engine lubrication and cooling systems, wheel end bearings, alignment diagnostics, alignment adjustment and repair, and wheels & tires. If these elements show weakness in the next testing cycle we will examine them closely and make changes.

Continuing education survey:
This survey goes out to PCC Diesel graduates who have or are in the process of pursuing an advanced degree. The first year we identified only two individuals, and of those two only one of them replied. We’re aware of three more students who are currently attending the Diesel Technology program at Montana State University Northern. We will be surveying them this year. See Appendix 5e for a sample copy of the survey.
B. **Addressing College Core Outcomes**

Describe how each of the College Core Outcomes is addressed in courses, and/or aligned with program and/or course outcomes.

*Communication skills are addressed in most courses by requiring students to complete lab reports, most of which are evaluated by the instructor in the presence of the student. Students are quizzed on the spot to evaluate their grasp of the concepts as well as their ability to communicate effectively. Some courses also contain labs that have a “daily log”, which require students to document their findings each day. Other courses require students to write reports on a technical subject related to the course.*

*Because we are a Career Technical program, our program and course outcomes primarily stress professional competence, critical thinking and problem solving skills. Diagnostics and failure analysis are an integral part of each class; both require knowledge of the subject and an objective, logical problem solving approach.*

*Community and Environmental responsibility outcomes are addressed in each class in the context of waste disposal, clean-up procedures and proper disposal of recyclable materials. Our industry has made great strides in the past 30 years in adopting technology to trap, clean and recycle such potentially damaging materials as used oil, refrigerants, fuels and combustion gasses. For instance, during the Air Conditioning class, EPA regulations are addressed by having students qualify for the EPA Section 609 Refrigerant & Recovery certification.*

*Cultural Awareness outcomes are addressed in each course through our Safety and Work Ethic assessments and attendance. Each business has its own unique culture; however safety and work ethics are consistent themes throughout the industry. We address these themes with our students by stressing attendance guidelines, productive use of class time, industry safety standards and respect for others as grading elements. Those who ignore our safety rules, skip class, are frequently late or who leave class before the end of class are subject to points deductions or disciplinary action.*

*Self-awareness outcomes are addressed in some classes by having each student research and produce a report on a topic that is of interest to them, or to reflect on their own talents regarding what they may specialize in and who they might want to work for.*
### CORE OUTCOMES MAPPING

**SAC DST: Diesel Service Technology**

**Mapping Level Indicators:**

- 0: Not Applicable.
- 1: Limited demonstration or application of knowledge and skills.
- 2: Basic demonstration and application of knowledge and skills.
- 3: Demonstrated comprehension and is able to apply essential knowledge and skills.
- 4: Demonstrates thorough, effective and/or sophisticated application of knowledge and skills.

<table>
<thead>
<tr>
<th>Course</th>
<th>Course Name</th>
<th>CO1</th>
<th>CO2</th>
<th>CO3</th>
<th>CO4</th>
<th>CO5</th>
<th>CO6</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS101</td>
<td>Diesel Engine Rebuild</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>DS102</td>
<td>Truck Power Train</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>DS103</td>
<td>Fuel Injection Systems</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>DS104</td>
<td>Fundamentals of Electricity &amp; Electronics</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>DS105</td>
<td>Fundamentals of Hydraulics &amp; Air Conditioning Systems</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>DS106</td>
<td>PMI/Detroit Diesel Electronic Control</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>DS202</td>
<td>Heavy Duty Power Train</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>DS203</td>
<td>Fuel Injection System Diagnostics &amp; Cat Elect Eng Controls</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>DS204</td>
<td>Diesel Starting, Charging and Electrical Control Systems</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>DS205</td>
<td>Mobile and Hydrostatic Hydraulics</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>DS206</td>
<td>Medium/Heavy Duty Truck Brake, Suspension &amp; Steering</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

**Core Outcomes:**

1. Communication.
2. Community and Environmental Responsibility.
5. Professional Competence.
C. List your degree and certificate student learning outcomes, showing the alignment with the college core outcomes, and identify the strategies that are in place to assess the degree and certificate outcomes.

<table>
<thead>
<tr>
<th>Diesel Service Outcome</th>
<th>PCC Core Outcome</th>
<th>Assessment Setting &amp; Method</th>
<th>When will assessment take place?</th>
<th>Degree or Certificate Assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apply skills and knowledge to repair and maintain diesel industry equipment systems to industry standards</td>
<td>CO2 &amp; CO5</td>
<td>Proctored exam. ASE Student Certification (TSA)</td>
<td>Every Fall &amp; Spring</td>
<td>ALL</td>
</tr>
<tr>
<td>Apply employability skills and knowledge to seek and acquire employment</td>
<td>CO1 &amp; CO4</td>
<td>Classroom. All students must take CG209. Assessment of this outcome will be done in CG209 Job Finding Skills.</td>
<td>Winter 2014</td>
<td>ALL</td>
</tr>
<tr>
<td>Work safely in the diesel industry.</td>
<td>CO2</td>
<td>Classroom &amp; lab. Instructor will carry a safety spreadsheet each day and note any violations to the work ethic &amp; professionalism guidelines.</td>
<td>Winter 2014</td>
<td>ALL</td>
</tr>
<tr>
<td>Utilize appropriate equipment, tooling, and literature to collect, analyze, and interpret data for diesel equipment systems diagnostics and repair.</td>
<td>CO1, CO3, CO5</td>
<td>Classroom &amp; lab. proctored exam. ASE Student Certification (TSA)</td>
<td>Every Fall &amp; Spring</td>
<td>ALL</td>
</tr>
<tr>
<td>Work ethically and professionally in the diesel repair industry.</td>
<td>CO2 &amp; CO6</td>
<td>Classroom &amp; lab. Attendance &amp; work ethics records from each instructor.</td>
<td>Spring 2013</td>
<td>AAS</td>
</tr>
<tr>
<td>Continue education through life-long learning; i.e., four year university, industry training, ASE certifications, etc.</td>
<td>CO6</td>
<td>Voluntary mail survey. Contact and survey former students who have transferred to a 4 year program (MSUN). Also establish contact with representative of 4 year program and interview / survey them regarding our graduates’ performance.</td>
<td>Winter 2014</td>
<td>AAS</td>
</tr>
</tbody>
</table>

CO1 - Communication.
CO2 - Community and Environmental Responsibility.
CO3 - Critical Thinking and Problem Solving.
CO4 - Cultural Awareness.
CO5 - Professional Competence.
CO6 - Self-Reflection.
i. Describe the assessment design and processes that are used to determine whether students have met the outcomes of their degree or certificate.

Our assessments include the ASE Student Certification exams. These are proctored exams that students take once they have completed the relevant courses. The test subject matter is divided into 4 major categories, each having up to 7 related sub-categories: Diesel Engines, Electricity & Electronics, Brakes, and Steering and Suspension Systems. Passing scores for all exams are 20 correct answers out of 40 questions and the results are compared to national rankings from participating schools.

The Safety Assessment involves recording and reporting the number and nature of student safety violations taken from our general safety rules. Statistics are derived from the total number and nature of safety violations. Safety categories include student use of proper Personal Protective Equipment (boots, eye protection, coveralls, hearing protection, gloves), safe equipment operation, correction of slip and trip hazards, proper lockout/tag-out procedures, proper security of vehicles under repair (wheel chocks, jack stands, etc.), and “other”.

The Attendance & Work Ethics Assessment involves recording and reporting the number and nature of student work ethic violations including participation in lab clean-up, proper use of tools and service literature, possession of personal tools, productive use of class time, and respect for others. Statistics are derived from the nature of the violations and the number of violations. Included in work ethics is attendance and involves reporting the attendance habits of each student at the end of the assessment period. Statistics are derived from the total number of class sessions and the number of attendance violations including being late, leaving class early, and skipping class entirely. Special circumstances are taken into account when appropriate.

Our two other assessments are the Student Survey, sent to former students who have moved on to attend a 4 year program. The survey asks former students to rank from 1 to 10 (1 being lowest, 10 being highest) on 20 different subjects about how well they believe our program prepared them for advanced collegiate study.

The Job Finding Skills assessment is administered by Nancy Pitzer (PCC Student Employment & Cooperative Education Coordinator) upon the completion of her CG209 Job Finding Skills class. CG209 is required for all of our certificates and degrees. Nancy makes her assessment results available to us once they are available.
ii. Summarize the results of the assessments of these outcomes.

We have only completed one testing session (about 42 exams) since beginning the ASE Student Certification exams. Out of 42 exams only three resulted in a non-passing score. The average ranking (compared to the national averages) among our students were as follows:

- Diesel Engines: 83rd percentile
- Electrical & Electronic Systems: 94th percentile
- Brakes: 87th percentile
- Steering & Suspension Systems: 77th percentile.

The Safety Assessment for spring 2013 recorded 22 total safety violations during the assessment period. 50% of those involved lack of or improper use of eye protection, 32% involved lack of or improper use of coveralls, and 18% involved the lack of or improper foot wear. It must be noted that the total number of safety violations during our spring 2013 assessment declined from 81 to 22 compared to spring 2012.

To give meaning to the absenteeism portion of the Attendance assessment, the number of contact hours students missed in all classes due to their absence was compared to the total possible contact hours available in all classes. For spring 2013 students were absent for 567 contact hours, or 4% of the total.

The tardiness and leave early portion of the Attendance assessment was a simple comparison of the total number of times students were late for class and / or left early without excuse. For spring 2013 students were late and / or left early 153 times, or 6% of all class meetings.

The Work Ethic portion of the assessment is a simple count of violations. The assessment resulted in counting only 11 violations. This came from one instructor, 100% or which involved unproductive use of class time. Participation in this assessment is a problem that we will address during the next assessment cycle.

Objective industry standards for safety, work ethics and attendance are difficult to come by. We have addressed this issue with our advisory committee members and are awaiting relevant feedback.

iii. Identify and give examples of assessment-driven changes that have been made to improve students’ attainment of degree and certificate outcomes.

All students are required to complete CG 209 Career Guidance. During this course, students interview with an industry employer of their choice and gain valuable experience.

Students are tracked and scored on safety. Our safety rules mirror those used in many company safety programs.

Students are encouraged to take the ASE certification tests. ASE certification is an industry recognized “stamp of excellence”.

An articulation agreement with MSUN has been establish and one is in development with Centralia College.
Students have been given access to Freightliner ARC (Aftermarket Recourse Center) training materials.

Practical tests are continually updated and enhanced to mimic tasks our graduates should expect to perform as a technician.
3. Other Curricular Issues

A. To what degree are courses offered in a Distance modality (on-line, hybrid, interactive television, etc.)? For courses offered both via DL and on-campus, are there differences in student success? (Contact the Office of Institutional Effectiveness, either Laura Massey or Rob Vergun, for course-level data). If so, how are you, or will you address these differences. What significant revelations, concerns or questions arise in the area of DL delivery?

We are currently beginning the process of converting and adopting parts of our curriculum to D2L format. We will be exploring this in greater detail in the near future. D2L promises to provide us a way to deliver more updated content.

The Truck Power Trains and Brakes classes utilize the distance training system offered by Meritor called The Bullpen. The Bullpen offers dealership technicians an online, multi-media training experience complete with a test out feature and certification. Meritor has graciously given two of our instructors’ administrative rights and a free hand to use the courses. These courses are currently assigned as homework.

B. Has the SAC made any curricular changes as a result of exploring/adopting educational initiatives (e.g., Service Learning, Internationalization of the Curriculum, Inquiry-Based Learning, Honors, etc.)? If so, please describe.

Not at this time.

C. Are there any courses in the program that are offered as Dual Credit at area High Schools? If so, describe how does the SAC develops and maintains relationships with the HS faculty in support of quality instruction. Please note any best practices you have found, or ideas about how to strengthen this interaction.

Not at this time.

D. Does the SAC plan to develop any additional Dual Credit agreements with area high schools? If so please describe. If not, what does the SAC see as barriers to developing further dual credit agreements?

Not at this time.

E. Identify and explain any other significant curricular changes that have been made since the last review.

The diesel industry is constantly changing. Since the last review, we have adopted Snap-On’s digital multi-meter curriculum. Exhaust after-treatment systems are now taught in the program. New fuel systems have been incorporated into the curriculum. New diagnostic software is used on a daily basis in the lab. New computer interface devices have been purchased and students must now learn how to program computers to allow for the functionality of these devices. We now have Smart Board technology in three of our four classrooms. We are using industry experts to come into our classes and give guest lectures.
4. Needs of Students and the Community

A. How is instruction informed by student demographics?

According to campus statistics, the demographic makeup of our student body has experienced no notable change during the intervening period. The number of women enrolling in our program is steadily increasing by 2 to 3 each year. However, they remain an under-represented segment making up less than 10% of our current student body count of 144.

The average student body size over the past 5 years has declined somewhat. During the 2010-2011 year we averaged 165 students, which decreased to 164 during the next year. However, our average student body size declined to 144 during the 2012-2013 year—a 12% decrease. This is thought to be due to the improving economy in the Portland area.

If viewed within the context of age, the bulk of our student body over the past 5 years remains between the ages of 21 and 40. These students are most likely unemployed workers seeking retraining, discharged veterans or working students looking for better opportunities. Younger students between the ages of 18 and 20 (presumably recent high school graduates) average only about 16% of our student body. Older students (40 and older) comprise the remainder of our student body.
Statistics from Nancy Pitzer’s CG209 assessment (spring of 2012) indicate that about 40% of our students hold down a job while attending class.

Although this doesn’t directly affect the curriculum, it illustrates the need for alternatives to the traditional day format. We offer students one night class each term. This provides working students an opportunity to complete all of the core diesel courses during their off-shift hours. These classes are typically full, like our day classes. This alternative also provides an opportunity to those who do not work to “double-up” on their course load and finish their degree in half the normal time.
B. Have there been any notable changes in instruction due to changes in demographics since the last review?

No. However we recognize that changes will occur and we are willing and able to make adjustments.

C. Describe current and projected demand and enrollment patterns. Include discussion of any impact this will have on the program/discipline.

The average enrollment during the past 5 years has remained above our student capacity of 100. This has created problems regarding available lab resources and classroom/lab overcrowding. We addressed part of the overcrowding by consolidating two smaller classrooms (fuels lecture and lab...room 113) into one large classroom, and by having a storage mezzanine built. However, the recent 12% decline during the 2012 to 2013 year represents a loss of only 20 students from the previous year and our classes remain full. We anticipate that the decline will continue as the local economy improves, but we don’t anticipate it to be any greater than what the college as a whole would experience.

The Oregon Labor Market Information System (OLMIS) is predicting the demand for diesel technicians between 2010 and 2020 to grow at an annual rate of about 16% per year. In real terms, this means that the Oregon labor market for diesel technicians will grow by about 120 jobs each year. This is considered by OLMIS officials as average in relationship to other labor markets. We are currently maintaining an enrollment of 90 to 100 students and graduate an average of 21 each year. There are 4 other colleges in the state that offer diesel technology, however we are the largest program in the region. If each diesel technology program in the State of Oregon had similar graduation rates as PCC – and all of those graduates were employed by businesses in the state of Oregon – the market would still be underserved by about 13%. If we factor in the demand for students with advanced degrees – presumably for supervision and management – the statistics would show that the market is even more underserved. See the OLMIS Projections in Appendix 6.

Of course, this doesn’t mean that our enrollment will increase or remain the same in response to this demand. In fact, the enrollment trend in our department appears to have an inverse relationship with economic activity. That is, when times are good our enrollment goes down, when times are bad enrollment goes up. If the economy improves we could see a decrease in enrollment; however in response we would increase our recruitment activities. If the economy stays the same or gets worse, we have class limits to avoid more overcrowding.
D. What strategies are used within the program/discipline to facilitate access and diversity?

Our courses are non-sequential, so all new enrollees can start with any of our courses. We have implemented entrance requirements to allow greater access to qualified students.

Gratia Minor (Learning Skills Specialist) has been instrumental in helping new students plan their education. Gratia is typically the first contact new students have with the program and continues to provide valuable scheduling, academic advice and tutoring.

E. Describe the methods used to ensure faculty are working with Disability Services to implement approved academic accommodations?

Each instructor is responsible for adhering to the accommodation documentation presented by students with disabilities. Documentation is provided by the student outlining his/her special needs. Often course progress notifications are requested by Gratia Minor to monitor student progress and students provide Gratia feedback regarding instructors’ adherence to their documented needs.

F. Has feedback from students, community groups, transfer institutions, business, industry or government been used to make curriculum or instructional changes (if this has not been addressed elsewhere in this document)? If so, describe.

Yes. Most notable has been our policies regarding student attendance and work ethic. Our advisory committee members have made it clear to us that above all skills, employability and work ethic determine the long term success in their organizations. Our response has been to closely track and grade students according to attendance, adherence to safety policies, use of class time, participation in general shop activities such as clean-up, and their demonstrated respect for other students and staff. The objective is to emphasize to our students that in addition to professional competence, personal work ethic and safety are prized values among the employers who hire from our program.

We recently received a request from our advisory committee to explore and present a Co-operative education option and are putting together an information package for them. We have received valuable advice from Nancy Pitzer of Student Employment & Cooperative Education and George Warneke of Auto Collision in this regard and feel we can present something of interest to the committee.
5. Faculty: reflect on the composition, qualifications and development of the faculty

A. Provide information on:
   i. Quantity and quality of the faculty needed to meet the needs of the program/discipline.

      Currently we have 4 full time instructors, 1 full time instructional support technician and 1 Learning Skills Specialist. Our instructors are all ASE certified in the area of their specialty, three are ASE Master Certified Truck Technicians. All of our instructors attend training in excess of 20 hours in the specialty that they teach. Three of our instructors hold a Bachelors of Science in Diesel Power Technology and the average industry experience level is about 25 years.

   ii. Extent of faculty turnover and changes anticipated in the next five years.

      Over the past 5 years we have replaced two instructors; one due to a terminal illness and the other due to retirement. Within the next 5 years – although not confirmed – it is possible that we will see one more instructor and our instructional support technician retire.

   iii. Extent of the reliance upon part-time faculty and how they compare with full-time faculty in terms of educational and experiential backgrounds.

      We currently do not employ any part-time faculty. The industry we serve and the type of people that make up the relevant work force makes it very difficult to attract part-time faculty.

   iv. How the faculty composition reflects the diversity and cultural competency goals of the institution.

      We are still working towards reflecting the goals of the institution in regard to diversity and cultural competency. Our industry is struggling to attract qualified women and minorities as well.

B. Report any changes the SAC has made to instructor qualifications since the last review and the reason for the changes.

   The instructor qualifications were updated in 2010. Education preferences were added and experience requirements were expanded from two years to five to attract applicants with more education and experience.

   **Professional Technical & Part Time Qualifications, prior to the 2010 revision:**

   Preferred Experience:
   Minimum of two years teaching Diesel Service Technology at an accredited institution OR two years recent industry experience in Diesel Technology repair operations, in accordance with current industry standards
   OR
   Two years combination of related teaching and industry experience as described above AND have the ability to work positively with students AND some experience working or teaching the technical area specific to the subject being taught.
**Current Professional Technical & Part Time Qualifications:**

**Preferred Education:**
AAS or Bachelor’s Degree (or higher) in diesel service or a field appropriate to diesel service is preferred but not required. ASE certification in all areas of instruction is required within the first year of hire.

**Preferred Experience:**
Five years recent diesel service experience required. Five years recent experience teaching at the college level or industry trainer experience or a combination of teaching at the college level and industry trainer experience may be substituted, year for year, for recent diesel service experience.

C. How have professional development activities of the faculty contributed to the strength of the program/discipline? If such activities have resulted in instructional or curricular changes, please describe.

*Our NATEF certification requires each instructor to complete 20 hours of technical training related to their teaching specialty. We are constantly updating our curriculum to reflect the changes in our industry.*

*In diesel fuel systems, numerous industry classes taken by the instructors have speeded the integration of technology developed to meet current EPA emission standards.*

*In powertrains, industry classes taken from manufacturers and dealers have widened the scope of the curriculum related to electronic powertrain controls.*

*The addition of two new trucks (Freightliner Cascadia and Columbia class trucks) and the subsequent industry training have facilitated the integration of data link related technologies into all curriculums.*

*Our professional development activities have strengthened our relationships with dealers and manufacturers. Industry partners like Eaton Corporation, Bobcat Equipment, Freightliner Truck Company, Meritor Inc., and Cummins Inc., donate state-of-the-art equipment, provide access to training materials, and contribute to department sponsored functions such as Diesel Day. We in turn provide a venue for them to do hands on training sessions for their employees, which we are free to attend.*
6. Facilities and Support

A. Describe how classroom space, classroom technology, laboratory space and equipment impact student success.

Recent upgrades and renovations to our classrooms have helped alleviate the problems associated with our over-capacity student body as well as improve our ability to deliver more meaningful content in a more comfortable setting. The consolidation of the fuels lab & lecture rooms (now room 113) allows us to use it every term for more subjects. Before, classes with more than 22 students could not be taught in either room due to fire code restrictions. The SMART Technology upgrades in rooms 109, 112 & 113 enable us to use a broader range of multi-media presentations and draw over such things as schematics, PowerPoint presentations and diagrams. The installation of podiums and the upgrading of computers and multimedia equipment in all 4 classrooms created roomier, cleaner classrooms.

The addition of the mezzanine in 2012 has saved us set-up time and added much needed dry storage. Our lack of lab space remains a problem, however. Our capacity enrollment and lack of lab space make organizing complex activities such as the disassembly of heavy components – some with 100’s of individual parts – difficult to manage. Parts are frequently lost, mixed up with neighboring lab groups, damaged due to mishandling or simply not accounted for properly. Students do not have the opportunity to develop organizational and contamination control skills during component disassembly and reassembly. See Appendix 7 for a graphical representation of the lab. The total lab area is approximately 10,636 square feet, approximately 1473 square feet being reserved for ingress and egress, and safe routes of escape in case of emergencies. Equipment, work benches, student tool storage and project components take up an additional 1200 square feet. This leaves about 7,762 square feet for instruction, of which 864 square feet must be reserved for truck related projects.

B. Describe how students are using the library or other outside-the-classroom information resources.

Our students are encouraged to use the library to research resource materials for term papers and other course specific assignments. The library retains copies of all course textbooks for students lacking the means to buy them. Students are also encouraged to use online resources provided by dealers and manufacturers such as Caterpillar, Freightliner, Eaton and Meritor. Service manuals and specifications can often be found for free.

C. Provide information on clerical, technical, administrative and/or tutoring support.

Our Learning Skills Specialist Gratia Minor provides tutoring services and advising support for our students. Students also use the Student Learning Center and Computer Center for assistance. We share an administrative assistant with two other departments in the division.

D. Provide information on how Advising, Counseling, Disability Services and other student services impact students.

Gratia Minor is our Learning Skills Specialist and our Academic Advisor. She helps track our students using Grad Plan. She also offers specialized tutoring sessions after class and works one-on-one with students who need additional assistance. Gratia knows our program well and is able to help our students with financial aid and scholarship applications, time management, technical and academic skills, and college survival skills.
We have had many students who have learning disabilities. We work with the office of students with disabilities and provide the required accommodations to students whom have a need for special assistance.

The faculty and staff all play a part in the advising of students. Prospective students are invited in for tours and advising all through the year.

E. Describe current patterns of scheduling (such as modality, class size, duration, times, location, or other), address the pedagogy of the program/discipline and the needs of students.

Currently we offer between 7 & 8 different classes per 12 week term, most are split into 6 week modules. Engine Rebuild (DS101) is the only full term 12 credit course we offer. The only other deviation from the 6/6 modular format is Preventative Maintenance Inspection and Detroit Diesel Electronic Control (DS106) and Med / Heavy Brakes, Suspension and Steering (DS206). These two are a 4/8 week split.

All classes are offered at night at least once each year, providing students the opportunity to complete their degree or certificate while working full or part time.

All classes are offered at the Rock Creek Campus in Building 2, which houses 4 dedicated classrooms and one dedicated laboratory. All courses are structured in the lecture/lab format and last for 5.5 hours each day. All classes start at 7:00 am and end at 12:30 pm, allowing for a one-half hour lunch break at 10:30 am. The night class starts at 5:00 pm and ends at 10:30 pm, allowing for a one-half hour lunch break at 6:00 pm.

Our non-sequential, open enrollment policy allows anyone to start the program, having met the college and program requirements, according to their interest and talent. Often younger students have been directed to the program by high school guidance counselors who have no understanding of what skills or aptitude the student must start with, while others are attracted to the program under the mistaken notion that it does not require academic skills. This serves to inflate our student body somewhat with people who hold the mistaken view that aptitude alone will get them through the program, or that adequate reading and math skills or familiarity with the physical sciences are not necessary.

Most of our classes require some familiarity with certain physical principles such as electricity, magnetism, hydraulics and pneumatics; this comes as an unwelcomed shock to students who either did not do well in high school science classes or have never developed an interest in science. The lack of physics and math skills require our instructors to remediate those students at the expense of advancing the core curriculum.
7. **Career and Technical Education (CTE) Programs only:** to ensure that the curriculum keeps pace with changing employer needs and continues to successfully prepare students to enter a career field.

A. Evaluate the impact of the Advisory Committee on curriculum and instructional content methods, and/or outcomes. Please include minutes from the last three Advisory Committee meetings in the appendix.

   The Diesel Service Technology Advisory Committee is very active. Each year, in conjunction with the Oregon Trucking Association, we host the Oregon Trucking Association Technology and Maintenance Fair. This event brings in industry experts to discuss relevant industry topics. Our students are allowed and encouraged to attend. See Appendix 8 for Advisory Committee meeting minutes.

   The Advisory Committee recently conducted our mid-term NATEF certification review, which helps us prepare for the full 5 year certification process. They also have driven many changes in our program. Of these include:

   - New academic prerequisites
   - Attendance requirements
   - Safety clothing requirements
   - Curriculum changes in the technical areas
   - Fall term 2013, 5 different companies sat on an industry panel to stress key industry topics to our entire student body.

B. How are students selected and/or prepared for program entry?

   Students must take the Compass placement test and score at or above the following requirements:

1. RD 80 or higher or equivalent placement test score.

2. MTH 20 or higher or equivalent placement test score or successful completion of the Diesel Service Technology (DST) Math Entrance Exam. The DST Math Entrance Exam was created in conjunction with the math department and tested on our student body during the winter of 2011. See Appendix 4 for details.

   Each new student speaks to an advisor who details the entry requirements. After the placement test, the student again sees an advisor who helps him/her map out a strategy for the timely completion of the program.
C. Review job placement data for students over the last five years, including salary information where available. Forecast future employment opportunities for students, including national or state forecasts if appropriate.

Job placement data is extremely hard to provide given the fact that most graduates do not communicate their job hunting success to the college. Employment surveys (provided by Nancy Pitzer of the Career Resources Center) from the past few years indicate that about roughly 25% of our students were already employed in the trade when they entered the program. The remaining 60% used the Career Resource Center, other resources or continued their education.

![2012 Student Body Employment Status](image)

We can say that local employer’s keep our Student Employment & Cooperative Education Coordinator (Nancy Pitzer) well informed about current and future job opportunities. Another issue concerning Job Placement data is the result of the dwindling resources of the Student Employment & Cooperative Education Center, due mostly to staff reductions.
The Oregon Labor Market Information System (OLMIS) is predicting the demand for diesel technicians between 2010 and 2020 to grow at an annual rate of about 16%, mostly to replace retiring technicians. In real terms, this means that the labor market for diesel technicians will grow by about 120 jobs each year. If the demand for Supervisors and Managers are factored in, new jobs will grow by about 180 per year. See Appendix 6a for OLMIS projection details.

**OLMIS Annual Projected Openings - 2010 to 2020**

- **Bus and Truck Mechanics and Diesel Engine Specialists (49-3031)**: 69
- **Farm Equipment Mechanics (49-3041)**: 33
- **Mobile Heavy Equipment Mechanics, Except Engines (49-3042)**: 18
- **Supervisors and Managers of Mechanics, Installers, and Repairers (49-1011)**: 62
2013 Oregon Employment Department wage statistics show that starting wages for diesel technicians have increased by about 10% during the last 5 years. The starting wages for an entry level technician now average $16.46, with the higher end of this average going to Heavy Equipment Technicians.

Top wages during the last 5 years have also increased by about 11%. The top wages for journeyman or master technicians now average $25.58, with the higher end of the average again going to Heavy Equipment Technicians.

National forecasts predict the same annual rate of demand as OLMIS, with some higher demand anticipated in the northern plains states due to oil exploration and production. O-Net Occupational statistics indicate the growth in demand for diesel technicians nationwide to not exceed the average in other professions and could fluctuate between 10% and 19%.

The national median wage for diesel technicians of all classes is around $20.35 as compared to Oregon’s median wage of around $21.23. These statistics are also from O-Net Occupational and the US Department of Labor. Wage statistics are detailed more in Appendix 6b.
D. Analyze any barriers to degree or certificate completion that your students face, and identify common reasons that students may leave before completion.

A portion of our students work full time jobs while attending classes. The decision to attend PCC is made despite knowing the amount of time they are likely to dedicate in order to successfully complete the courses or program. Time conflicts are common and students who do work often run afoul of our attendance policies. Often this is a problem of time management; Gratia Minor (Learning Skills Specialist) is offering students short information sessions addressing this issue.

E. Describe opportunities that exist or are in development for graduates of this program to continue their education in this career area or profession.

We currently have an articulation agreement with Montana State University Northern (MSUN). They accept all of the program credits toward their B.S. degree in Diesel Technology program. AAS graduates from PCC spend two more years in the MSUN program before moving on into the industry, experiencing significantly higher starting wages and faster organizational advancement.

Oregon Institute of Technology offers our AAS graduates the opportunity to complete a BS degree in Industrial Management; however students have reported problems transferring credits. We do not have any agreements with OIT.

We are currently advising and counseling Centralia College in Centralia, WA. in their effort to develop a 4 year B.S. degree in Diesel Service. PCC’s Diesel Service program is one of the largest on the West coast, so naturally our students would be heavily recruited by Centralia and their industry partners.

F. Describe and explain any additional changes that have been made to the program since the last program review.

We designed and purchased new shop benches that are stackable to allow us to maximize the space in our shop.

New equipment and trucks have been donated.

Test equipment has been purchased.

Training aids have been build, received through donations and have been built by our students.

New faculty has been hired.

New products are being taught.

Two of our courses, DS106 and DS206 have had contact hour and credit changes.

SMART Technology has been added to classrooms.

A mezzanine was built to provide additional dry storage and free up lab space for instruction.
8. Recommendations

A. Identify recommendations related to teaching and learning that derive from results of the assessment of student learning outcomes (course, degree, certificate and/or College Core Outcomes).

We have implemented student ASE tests for all Diesel Service Technology students. These tests will provide us with a consistent and repeatable testing tool to evaluate the strengths and weaknesses of our technical training. Our first tests were in spring of 2013 and as we move forward, we will have sufficient data to analyze our effectiveness. This will be an ongoing practice and all students are required to complete these tests before graduation.

B. Identify recommendations relevant to areas such as maintaining a current curriculum, professional development, access and success for students, obtaining needed resources, and being responsive to community needs. For recommendations that require additional funding, present them in priority order.

1. Our laboratory space remains a problem given the number of students we are currently teaching. Unless our enrollment falls off dramatically in the next 5 years, we will continue to struggle with this problem. Whatever expansion opportunities that may be forthcoming in the future will need to be explored.

2. We currently have only one Instructional Support Technician to service a student body of over 100 students. The majority of his time during the day is taken up by his tool room duties (distributing tools, service literature, etc.). The remainder of his day (about 2.5 hours) is taken up by other duties such as purchasing parts, repairing tools, receiving supplies, data entry for the accounting department, safety inspections and hazardous waste disposal duties, building/modifying or repairing lab equipment, managing computer updates, etc. Having no tool room attendant during the night class forces the instructor to restrict access to the tool room, which frustrates student lab activities, or allow unrestricted access, which is against school policy. Allowing unrestricted access is not a good solution for activities that require a lot of tools as the tools get broken, are misplaced or stolen. We recently decided to hire one student as a part time Support Technician assistant, but if our enrollment remains at capacity a more permanent solution should be sought.

3. The application of advanced technology in our industry and the evolution toward integrated systems require a working knowledge of all the systems and how they affect each other. For this reason, a new methodology of instruction must be explored. Our program is non sequential; although this makes course scheduling easy for our students and provides a program entry point at the beginning of each term, we often find that there is a gap for those students who haven’t completed certain courses. Students struggle to understand how systems are integrated. We also find that students who have not been exposed to certain systems and diagnostic software struggle to develop the skills needed to be competent in diagnosing integrated systems. Although there are advantages to non-consequential courses, it also comes with these difficulties. The program has had many content changes as technology has changed but the basic structure has remained the same. We feel it is time to reorganize the program to address these problems. We have explored several different program structure options. The one we feel has the most advantages is to have a two year program in which the first year is a prerequisite for the second. The first year could be comprised of three non-sequential terms. This would allow
students to start the program at the beginning of each term and therefore retain easy access, yet ensure that students are prepared to enter the second year of advanced classes. The second year could consist of three non-sequential terms allowing course selection flexibility. All students entering the second year will have acquired the fundamental knowledge of integrated systems, diagnostic software applications and systems. Having these base skills will allow students to advance further during their second year.
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### Appendix 1 – Program outcome changes

<table>
<thead>
<tr>
<th>1. Old Outcome</th>
<th>Diesel Service Outcome</th>
<th>PCC Core Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repair and maintain diesel engines and equipment to industry standards.</td>
<td>Apply skills and knowledge to repair and maintain diesel industry equipment systems to industry standards</td>
<td>CO2 &amp; CO5</td>
</tr>
<tr>
<td>Use professional and industry appropriate communication skills to converse with employers, co-workers and customers</td>
<td>Apply employability skills and knowledge to seek and acquire employment</td>
<td>CO1 &amp; CO4</td>
</tr>
<tr>
<td>Follow safety practices and work ethics as expected in the diesel industry</td>
<td>Work safely in the diesel industry.</td>
<td>CO2,</td>
</tr>
<tr>
<td>Utilize appropriate equipment, literature, measuring devices and computational technologies to collect, analyze, and interpret data to effectively diagnose and troubleshoot a stated problem</td>
<td>Utilize appropriate equipment, tooling, and literature to collect, analyze, and interpret data for diesel equipment systems diagnostics and repair.</td>
<td>CO1, CO3, CO5</td>
</tr>
<tr>
<td></td>
<td>Work ethically and professionally in the diesel repair industry.</td>
<td>CO2 &amp; CO6</td>
</tr>
<tr>
<td>Be prepared to transfer to a four year university diesel related program</td>
<td>Continue education through life-long learning; i.e., four year university, industry training, ASE certifications, etc.</td>
<td>CO6</td>
</tr>
</tbody>
</table>
## Appendix 2 – Course outcome changes

<table>
<thead>
<tr>
<th>Old Outcomes</th>
<th>New Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DS101 - Engine Rebuild and Lab Procedures</strong></td>
<td><strong>DS101 - Engine Rebuild and Lab Procedures</strong></td>
</tr>
<tr>
<td>Disassemble, inspect, reassemble and run an inoperative diesel engine to identify how all of the internal systems of an engine become a functional unit.</td>
<td>Analyze and determine the problem and implement the correct repair of diesel engines, components and systems.</td>
</tr>
<tr>
<td>Knowledge of how and why diesel engines work.</td>
<td>Conduct repairs in an ethical and professional manner, respecting industry safety and environmental guidelines.</td>
</tr>
<tr>
<td>Learn about the tools and materials needed to properly repair and maintain diesel engines.</td>
<td>Communicate with co-workers, customers, management and general public in a professional and knowledgeable manner.</td>
</tr>
<tr>
<td>Skills in engine failure diagnosis and practice researching the failure symptoms in service manuals and other sources to research and diagnose engine failures.</td>
<td></td>
</tr>
<tr>
<td>Practice personal safety by using protective gear and safe procedures in all work areas.</td>
<td></td>
</tr>
<tr>
<td><strong>DS102 - Truck Power Train</strong></td>
<td><strong>DS102 - Truck Power Train</strong></td>
</tr>
<tr>
<td>Disassemble, inspect, reassemble and understand the power flow of any number of transmissions.</td>
<td>Disassemble, inspect, reassemble and understand the power flow of transmissions.</td>
</tr>
<tr>
<td>Knowledge of how and why diesel engine clutches work.</td>
<td>Remove, disassemble, reassemble and install clutches.</td>
</tr>
<tr>
<td>Learn about the materials needed to properly repair and maintain power trains and their components.</td>
<td>Apply use of tools and materials needed to properly repair and maintain power trains and their components.</td>
</tr>
<tr>
<td>Develop skills in failure diagnosis and researching the failure symptoms in service manuals.</td>
<td>Diagnose failures and research the failure symptoms in service manuals.</td>
</tr>
<tr>
<td>Practice personal safety by using protective gear and safe procedures in all work areas.</td>
<td>Apply personal safety by using protective gear and safe procedures in all work areas.</td>
</tr>
<tr>
<td>Develop skills needed to attain employment though a mock employment interview.</td>
<td></td>
</tr>
<tr>
<td><strong>DS103 - Fuel Injection Systems</strong></td>
<td><strong>DS103 - Fuel Injection Systems</strong></td>
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<tr>
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</tr>
<tr>
<td>Develop skills to disassemble, inspect, reassemble and test fuel injection components and understand the relationship between component failure and engine operation.</td>
<td>Apply diesel engine knowledge to diesel fuel injections systems functions and how they relate to engine operation and performance.</td>
</tr>
<tr>
<td>Develop knowledge of how diesel engines operate.</td>
<td>Competently troubleshoot, evaluate and repair diesel fuel injection systems.</td>
</tr>
<tr>
<td>Develop resume and cover letter writing skills.</td>
<td>Disassemble test and reassemble fuel injection components.</td>
</tr>
<tr>
<td>Develop skills in diesel fuel system failure diagnosis.</td>
<td>Test diesel engines for fuel system malfunctions.</td>
</tr>
<tr>
<td>Practice personal safety by using protective gear and safe procedures in all work areas.</td>
<td>Apply knowledge of diesel fuels, fuel injection systems and how they relate to engine performance.</td>
</tr>
<tr>
<td>Research and locate repair literature.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>DS104 - Fundamentals of Electricity and Electronics</strong></th>
<th><strong>DS104 - Fundamentals of Electricity and Electronics</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquire knowledge of how and why automotive electricity works.</td>
<td>Apply basic theory of automotive electricity, components, schematics, controls and how they all relate to make a complete system.</td>
</tr>
<tr>
<td>Learn about the tools and materials needed to properly diagnose, repair and maintain electrical systems</td>
<td>Diagnose and repair electrical circuits.</td>
</tr>
<tr>
<td>Learn to identify and read electrical schematics, diagrams and drawings.</td>
<td>Conduct repairs in an ethical and professional manner, respecting industry safety and environmental guidelines.</td>
</tr>
<tr>
<td>Develop skills in electrical failure diagnosis.</td>
<td>Communicate with co-workers, customers, management and general public in a professional and knowledgeable manner.</td>
</tr>
<tr>
<td>Practice personal safety by using protective gear and safe procedures in all work areas.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>DS105 - Fundamentals of Hydraulics and Air Conditioning Systems</strong></th>
<th><strong>DS105 - Fundamentals of Hydraulics and Air Conditioning Systems</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop skills to disassemble, inspect, reassemble and test fuel hydraulic components and understand the relationship between component failure and hydraulic system operation.</td>
<td>Develop skills to disassemble, inspect, reassemble and test hydraulic components and understand the relationship between component failure and hydraulic system operation.</td>
</tr>
<tr>
<td>Develop knowledge of how hydraulic and air conditioning systems operate.</td>
<td>Develop knowledge of how hydraulic and air conditioning systems operate.</td>
</tr>
<tr>
<td>Develop a technical research paper.</td>
<td>Develop a technical research paper.</td>
</tr>
<tr>
<td>Develop skills in hydraulic and air conditioning system failure diagnosis.</td>
<td>Develop skills in hydraulic and air conditioning system failure diagnosis.</td>
</tr>
<tr>
<td>Practice personal safety by using protective gear and safe procedures in all work areas.</td>
<td>Practice personal safety by using protective gear and safe procedures in all work areas.</td>
</tr>
<tr>
<td><strong>DS106 - Engine Diagnostic Tune-Up</strong></td>
<td><strong>DS106 - Engine Diagnostic Tune-Up</strong></td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>---------------------------------------------------</td>
</tr>
<tr>
<td>Develop knowledge of diesel engine diagnostic tune up.</td>
<td>Apply knowledge of diesel engine diagnostic tune up.</td>
</tr>
<tr>
<td>Develop knowledge of how to analyze and diagnose diesel engines support systems.</td>
<td>Analyze and diagnose diesel engines support systems.</td>
</tr>
<tr>
<td>Learn about the tools and materials needed to properly analyze and tune up diesel engines.</td>
<td>Apply working knowledge about the tools and materials needed to properly analyze and tune up diesel engines.</td>
</tr>
<tr>
<td>Practice personal safety by using protective gear and safe procedures in all work areas.</td>
<td>Apply personal safety by using protective gear and safe procedures in all work areas.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>DS202 - Heavy Duty Power Train</strong></th>
<th><strong>DS202 - Heavy Duty Power Train</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of how torque converters work and where they are used.</td>
<td>Disassemble, inspect, reassemble and understand the power flow of heavy-duty on and off road automatic and power shift transmissions.</td>
</tr>
<tr>
<td>Learn about the materials needed to properly repair and maintain heavy-duty power trains and their components.</td>
<td>Apply theory and applications of various torque converter designs.</td>
</tr>
<tr>
<td>Develop skills in failure diagnosis and researching the failure symptoms in service manuals.</td>
<td>Apply knowledge of the materials needed to properly repair and maintain heavy-duty power trains and their components.</td>
</tr>
<tr>
<td>Practice personal safety by using protective gear and safe procedures in all work areas.</td>
<td>Diagnose failures and research the failure symptoms in service manuals.</td>
</tr>
<tr>
<td>Develop skills needed to use a computer program to assess diagnosis information from a computer-controlled transmission.</td>
<td>Apply personal safety by using protective gear and safe procedures in all work areas.</td>
</tr>
<tr>
<td></td>
<td>Assess diagnostic information from computer-controlled transmissions.</td>
</tr>
<tr>
<td><strong>DS203 - Fuel Injection System Diagnosis and Caterpillar Electronic Engine</strong></td>
<td><strong>DS203 - Fuel Injection System Diagnosis and Caterpillar Electronic Engine</strong></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Develop skills to disassemble, inspect, reassemble and test fuel injection pumps and governors and understand the relationship between component failure and engine operation.</td>
<td>Apply fuel injection systems knowledge to engine applications for maintenance and trouble shooting.</td>
</tr>
<tr>
<td>Develop skills to diagnose, repair and program Caterpillar electronic engines.</td>
<td>Competently diagnose, repair and program Caterpillar electronic engine controls.</td>
</tr>
<tr>
<td>Develop skills in diesel fuel injection pump and governor failure diagnosis.</td>
<td>Research and locate industry repair literature.</td>
</tr>
<tr>
<td>Develop job search skills.</td>
<td>Research a company and analyze the advantages and disadvantages of employment with the company.</td>
</tr>
<tr>
<td>Practice personal safety by using protective gear and safe procedures in all work areas.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>DS204 - Diesel Starting, Charging and Electronic Control Systems</strong></th>
<th><strong>DS204 - Diesel Starting, Charging and Electronic Control Systems</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Learn the different components of an automotive electrical system, how they all work together as a unit and how to properly diagnose and repair failures.</td>
<td>Analyze and determine the problem and implement the correct repair of automotive electrical components and systems.</td>
</tr>
<tr>
<td>Learn Cummins Electronic Engines.</td>
<td>Conduct repairs in an ethical and professional manner, respecting industry safety and environmental guidelines.</td>
</tr>
<tr>
<td>Acquire knowledge of how and why electric motors and generators work.</td>
<td>Communicate with co-workers, customers, management and general public in a professional and knowledgeable manner.</td>
</tr>
<tr>
<td>Learn Cummins Electronics Engine controls and diagnosis.</td>
<td></td>
</tr>
<tr>
<td>Learn about the tools and materials needed to properly repair and maintain electrical systems.</td>
<td></td>
</tr>
<tr>
<td>Learn to properly test and repair automotive electrical systems.</td>
<td></td>
</tr>
<tr>
<td>Develop skills in electrical failure diagnosis.</td>
<td></td>
</tr>
<tr>
<td>Practice personal safety by using protective gear and safe procedures in all work areas.</td>
<td></td>
</tr>
<tr>
<td><strong>DS205 - Mobile and Hydrostatic and Hydraulics</strong></td>
<td><strong>DS205 - Mobile and Hydrostatic and Hydraulics</strong></td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>Develop skills to disassemble, inspect, reassemble and test hydraulic and hydrostatic components and understand the relationship between component failure and hydraulic and hydrostatic system operation.</td>
<td>Apply hydraulic systems knowledge to equipment applications for maintenance and trouble shooting.</td>
</tr>
<tr>
<td>Develop knowledge of how hydraulic and hydrostatic systems operate.</td>
<td>Competently diagnose, test, repair and maintain mobile hydraulic and hydrostatic equipment.</td>
</tr>
<tr>
<td>Develop skills in hydraulic and hydrostatic system failure diagnosis.</td>
<td>Research and locate repair literature.</td>
</tr>
<tr>
<td>Practice personal safety by using protective gear and safe procedures in all work areas.</td>
<td>Interpret and apply hydraulic schematics.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>DS206 - Brakes, Suspensions, and Steering</strong></th>
<th><strong>DS206 - Brakes, Suspensions, and Steering</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Disassemble, inspect, reassemble and understand components of air brake systems, truck foundation brakes, antilock brake systems, steering systems, suspension systems, wheels and tires, and fifth wheels.</td>
<td>Disassemble, inspect, reassemble and understand components of air brake systems, truck foundation brakes, antilock brake systems, steering systems, suspension systems, wheels and tires, and fifth wheels.</td>
</tr>
<tr>
<td>Learn about the tools and materials needed to properly repair and maintain brake systems, steering systems, suspension systems, wheels, tires, and fifth wheels.</td>
<td>Apply knowledge of tools and materials needed to properly repair and maintain brake systems, steering systems, suspension systems, wheels, tires, and fifth wheels.</td>
</tr>
<tr>
<td>Skills in failure diagnosis and practice researching the failure symptoms in service manuals and other sources to research and diagnose failures.</td>
<td>Diagnose failures and practice researching the failure symptoms in service manuals and other sources to research and diagnose failures.</td>
</tr>
<tr>
<td>Practice personal safety by using protective gear and safe procedures in all work areas.</td>
<td>Apply personal safety by using protective gear and safe procedures in all work areas.</td>
</tr>
</tbody>
</table>
Appendix 3 – Diesel Service Math Entrance Exam Survey Results

**OVERALL STATISTICS:**

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Passing Score</td>
<td>75%</td>
</tr>
<tr>
<td>Total Students Surveyed</td>
<td>88</td>
</tr>
<tr>
<td>Total Below Passing Score</td>
<td>19</td>
</tr>
<tr>
<td>Percent Below Passing Score</td>
<td>22%</td>
</tr>
<tr>
<td>Total At or Above Passing Score</td>
<td>69</td>
</tr>
<tr>
<td>Percent At or Above Passing Score</td>
<td>78%</td>
</tr>
</tbody>
</table>

**Passing Scores by Terms Attended:**

<table>
<thead>
<tr>
<th>Term</th>
<th>Number Students</th>
<th>Number Below Passing</th>
<th>Percent Below Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Term</td>
<td>9</td>
<td>1</td>
<td>11%</td>
</tr>
<tr>
<td>2nd Term</td>
<td>19</td>
<td>6</td>
<td>32%</td>
</tr>
<tr>
<td>3rd Term</td>
<td>15</td>
<td>3</td>
<td>20%</td>
</tr>
<tr>
<td>4th Term</td>
<td>15</td>
<td>3</td>
<td>20%</td>
</tr>
<tr>
<td>5th Term</td>
<td>23</td>
<td>5</td>
<td>22%</td>
</tr>
<tr>
<td>6th Term</td>
<td>7</td>
<td>1</td>
<td>14%</td>
</tr>
</tbody>
</table>
### STUDENT BODY MATH EXPERIENCE

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Students without PCC Math</td>
<td>30</td>
<td>100%</td>
</tr>
<tr>
<td>Number of 1st Term Students without PCC Math</td>
<td>3</td>
<td>10%</td>
</tr>
<tr>
<td>Number of 2nd Term Students without PCC Math</td>
<td>2</td>
<td>7%</td>
</tr>
<tr>
<td>Number of 3rd Term Students without PCC Math</td>
<td>5</td>
<td>17%</td>
</tr>
<tr>
<td>Number of 4th Term Students without PCC Math</td>
<td>4</td>
<td>13%</td>
</tr>
<tr>
<td>Number of 5th Term Students without PCC Math</td>
<td>2</td>
<td>7%</td>
</tr>
<tr>
<td>Number of 6th or More Term Students without PCC Math</td>
<td>14</td>
<td>47%</td>
</tr>
</tbody>
</table>

### PAST MATH EXPERIENCE LEVEL

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algebra</td>
<td>39</td>
<td>44%</td>
</tr>
<tr>
<td>Precalculus &amp; Calculus</td>
<td>7</td>
<td>8%</td>
</tr>
<tr>
<td>General Math &amp; Prealgebra</td>
<td>10</td>
<td>11%</td>
</tr>
<tr>
<td>Geometry</td>
<td>14</td>
<td>16%</td>
</tr>
<tr>
<td>Trigonometry</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>Statistics</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>None</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>Unknown / Can’t Remember</td>
<td>12</td>
<td>14%</td>
</tr>
</tbody>
</table>
STATISTICAL BREAKDOWN BY SUBJECT

<table>
<thead>
<tr>
<th>QUESTIONS 1-4: ADDITION OF FRACTIONS</th>
<th>OVERALL AVERAGE SCORES</th>
<th>AVERAGE SCORES BY CLASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>75%</td>
<td>74%</td>
<td>89%</td>
</tr>
<tr>
<td>QUESTIONS 5-8: SUBTRACTION OF FRACTIONS</td>
<td>77%</td>
<td>79%</td>
</tr>
<tr>
<td>QUESTIONS 9-12: MULTIPLICATION OF FRACTIONS</td>
<td>89%</td>
<td>87%</td>
</tr>
<tr>
<td>QUESTIONS 13-16: DIVISION OF FRACTIONS</td>
<td>79%</td>
<td>83%</td>
</tr>
<tr>
<td>QUESTIONS 17-20: DECIMALS</td>
<td>85%</td>
<td>89%</td>
</tr>
<tr>
<td>QUESTIONS 21-24: CONVERSIONS</td>
<td>90%</td>
<td>93%</td>
</tr>
<tr>
<td>QUESTIONS 25-28: PERCENTAGES</td>
<td>89%</td>
<td>93%</td>
</tr>
<tr>
<td>QUESTIONS 29-32: TOLERANCES</td>
<td>73%</td>
<td>73%</td>
</tr>
<tr>
<td>QUESTIONS 33-36: RATIOS</td>
<td>91%</td>
<td>91%</td>
</tr>
<tr>
<td>QUESTIONS 37-40: FORMULAS</td>
<td>90%</td>
<td>92%</td>
</tr>
</tbody>
</table>
Annual Report for Assessment of Outcomes 2012-13

Subject Area Committee Name: Diesel Service
Contact person: Tyler Phillis
For LDC/DE: Core outcome(s) assessed: ____________
For CTE: Degree or certificate* assessed: Less-than-one year, 2 year and AAS
*please attach a table showing the alignment of the degree or certificate outcomes with the College Core Outcomes

Please address the questions below and send to learningassessment@pcc.edu by June 21, 2013 with Annual Report in the subject line

Note: Information provided in this report may be inserted into or summarized in Section 2C Program Review Outline.

1. Describe changes that have been implemented towards improving students’ attainment of outcomes that resulted from recent outcome assessments. These may include but are not limited to changes to content, materials, instruction, pedagogy etc. Please be sure to describe the connection between the assessment results and the changes made.
   - No changes were made as a result of last year’s assessments. It might be important to note that we replaced one instructor at the beginning of spring term. Although this was not the result of last year’s assessment it created a gap in the data for the safety and work ethic assessment.

For each outcome assessed this year:
2. Describe the assessment design (tool and processes) used. Include relevant information about:
   - The nature of the assessment (e.g., written work, project, portfolio, exam, survey, performance etc.) and if it is direct (assesses evidence mastery of outcomes) or indirect (student’s perception of mastery). Please give rationale for indirect assessments (direct assessments are preferable).
     - ASE Student Certification Exams (TSA’s). This is an industry recognized 3rd party, direct assessment program. Students take a series of multiple choice exams that cover the subject matter of our program. Test questions closely resemble ASE certification questions except for those addressing subjects that require industry experience. All testing is computer based and is done online, using a proctor and secured testing platform. ASE imposes time restrictions or a “test window” in which all tests are to be conducted. This consists of two 10 week periods, one during the fall and one during the spring of each year. The results are broken down into 4 general categories, each having up to 7 specific sub-categories.
Student attendance and work ethics survey. All instructors record and base a part of each student’s grade on attendance and work ethics. The method of recording each attendance and work ethic violation is up to the individual instructor, but generally they involve notations made directly in the grade books. Each instructor compiles the information and forwards it to the SAC chair after grades have been finalized. The information includes number of days missed (absent), number of days late, number of days the student left class early, number of safety violations and number of work ethic violations. The data from one instructor was not received at the time of this report.
- Attendance: the department policy regarding attendance is as follows:
  - *For each three days missed per six week module, the earned module letter grade will be lowered by one letter.*
  - *Late to class two times is equal to one missed day.*
  - *Leaving early is equal to coming late and will count accordingly.*

Make-up time is allowed on a case by case basis depending upon circumstances such as family illnesses or death, jury duty, National Guard duty, etc.

- Work Ethic: the department rubric regarding work ethic involves evaluating students using the following guidelines (a copy of the rubric is attached, see *Work Ethic & Professionalism Scoresheet.pdf*):
  - Safety – working in a safe manner, following shop safety rules. 10 safety categories are tracked:
    - Coveralls
    - Safety boots
    - Safety glasses and other eye protection
    - Hearing protection
    - Gloves
    - Equipment operation
    - Slip & trip hazards
    - Lockout/tag-out
    - Wheel chocks
    - Other
  - Clean up.
  - Use of proper tooling and service literature.
  - Personal tools at school.
  - Effective use of class time.
  - Respect for other students, instructors and staff

- The student sample assessed (including sample size relative to the targeted student population for the assessment activity) process and rationale for selection of the student sample. Why was this group of students and/or courses chosen?
  - For the ASE Student Certification – 12 students taking a total of 42 exams. Students that have completed the subjects covered by the exams were tested. Nine students elected to take all four tests while three students elected to take two tests only. Although we are only required to assess students pursuing the Associates Degree, we are assessing all students as long as they have completed the courses that are covered by
the exams. This will cover the possibility that the majority of future students elect to pursue the certificates rather than the degree. This number would have been closer to 20 but we missed the Fall 2012 testing window.

- For our work ethics and safety assessment all students that were enrolled in any of our Spring 2013 core classes were surveyed. This came to a total of 73 students. One instructor did not turn in his findings.

- Any rubrics, checklists, surveys or other tools that were used to evaluate the student work. (Please include with your report – OK to include in appendix). Where appropriate, identify benchmarks.

  - The ASE Student Certification is a pass/fail exam, the passing standards of which are determined using a contrasting groups approach. From the ASE Student Certification literature:

    “This method is based on actual performance of real students, not judgments of how students are likely to perform. Criterion groups of “should-pass,” “borderline,” and “should-not pass” students are selected in advance of testing. These selections are made by instructors with detailed knowledge of the level of preparedness of the students. After testing, a passing score is selected that minimizes the false-positive and false-negative classifications in the obtained score distributions of these groups. Passing standards set this way are generally regarded by instructors and administrators as more appropriate and more realistic than test-based judgmental approaches. These same passing standards are then carried forward to future forms of the NA3SA Exams.”

It should be noted that the criterion groups are selected by instructors and teachers chosen by ASE. Neither we nor our students are part of these criterion groups. The passing score for all exams is at least 20 out of 40 questions answered correctly. The raw data from the exams were compiled using Excel and the group performance broken down by main and sub-categories. The attached file entitled “ASESC_results_interpret_guide.pdf” provides a means by which each student can be compared to students who took the exams nationwide.

- The forms used for the attendance and work ethic assessment varied from instructor to instructor, however the criteria used to record violations was the same. Each instructor made notations indicating an absence, tardy, early departure and a safety violation on their daily roster, in a small notebook or directly in their grade book. Examples cannot be provided as they contain student names. Benchmarks are difficult to find regarding the effects of poor attendance, however studies show that poor attendance habits are directly related to a student’s employability. This is always an issue with the members of our advisory committee.

  - Attendance was calculated using an excel spreadsheet (see Safety & Work Ethic Statistics.pdf). The number of students was multiplied by the number of class meetings. This was compared to the total number of times students were absent and the total number of times students were late or left before class was over. The comparison is expressed as a percentage.

- How you analyzed results, including steps taken to ensure that results are reliable (consistent from one evaluator to another).

  - The ASE Student Certification exam scores for each student were compiled on an Excel spreadsheet and compared to the interpretation chart provided by ASE (see attached “ASESC_results_interpret_guide.pdf and TSA Statistical Analysis.pdf”). Student rankings within each main exam category were averaged to gain an overall picture of the groups ranking. For instance, if our students combined average fell within the 50th percentile it would mean that as a group they performed better than or equal to 50% of the students who took the exam in 2012.
For the attendance and work ethics assessment the compiled data from each instructor was evaluated using an Excel spreadsheet. Since we score each student individually, and since each student has – in the case of Spring 2013 – 40 class sessions during the term to be absent, late, leave early or commit safety & work ethic violations, the number of students was multiplied by the number of class meetings to arrive at a divisor to use for the attendance calculations. The safety violations were broken down into types of violations. Each type of violation was calculated as a percentage of the total number of violations.

3. **Provide information about the results (i.e., what did you learn about how well students are meeting the outcomes)?**
   - If scored (e.g., if a rubric or other scaled tool is used), please report the data, and relate to any appropriate benchmarks. Results should be broken down in a way that is meaningful and useful for making improvements to teaching/learning. Please show those specific results.
     - The ASE Student Certification exam results (group rankings) compared to exam scores nationwide are as follows. Included in the attachments is a detailed breakdown of these percentiles, including each student’s score in the sub-categories and where they fell within the national percentiles see Appendix 5a – *TSA Statistical Analysis.pdf*.
       - Diesel Engines – our student’s exam results averaged in the 83rd percentile.
       - Electrical & Electronic Systems – our student’s exam results averaged in the 93rd percentile.
       - Brakes – our student’s exam results averaged in the 87th percentile.
       - Steering & Suspension Systems – our student’s exam results averaged in the 77th percentile.
     - The attendance and work ethic results are as follows:
       - During DS101 (Engine Rebuild) there were 63 instances of students being absent, which represents 6.6% of the class meetings. There were a combined total of 81 instances of students being late or leaving early, which represents 8.4% of the class meetings.
       - During DS102/DS202 (Truck & Heavy Duty Power Trains) there were 38 instances of students being absent, which represents 3.7% of the class meeting. There were a combined total of 50 instances of students being late or leaving early, which represents 4.8% of the class meetings.
       - DS105/DS205 statistics were not available at the time of this report.
       - During DS206 (Brakes, Steering & Suspension) there were 15 instances of students being absent, which represents 2.3% of the class meetings. There were a combined total of 24 instances of students being late or leaving before the end of class, which represents 3.7% of the class meetings.
       - The safety & work ethic violations involved only a few items from our score sheet. There were 22 total safety violations and 11 work ethic related violations. The following is the list, from most to least commonly observed:
         - Use of class time (doing things other than assigned work) accounted for 100% of the observed items other than safety. This came from only one instructor and is likely not a good representative figure.
         - No eye protection (safety glasses, face shields, goggles, etc.) accounted for 50% of the observed violations.
• No coveralls accounted for 32% of the observed violations.
• No safety boots (leather topped, non-slip sole) accounted for 18% of the observed violations.

4. Identify any changes that should, as a result of this assessment, be implemented to help improve students’ attainment of outcomes. (These may include, but are not limited to, changes in curriculum, content, materials, instruction, pedagogy etc).

- Regarding the ASE Student Certification exams, two categories that may need closer scrutiny look to be Diesel Engines and Steering & Suspension Systems. It should be important to note that this was the first time an exit exam of this kind has been used and making changes based on these results may not be the best use of resources. Looking at the sub-category results reveals the following:
  - For Diesel Engines, the sub-categories of “Lubrication System”, “Cooling System” and “General” may need greater focus in future classes. See the table below for greater detail.

<table>
<thead>
<tr>
<th>MAX. SCORES</th>
<th>7</th>
<th>4</th>
<th>3</th>
<th>4</th>
<th>7</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>SESSION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GENERAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIL. HEAD &amp; VALVE TRAIN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGINE BLOCK</td>
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</tr>
<tr>
<td>LUBRICATION SYSTEM</td>
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</tr>
<tr>
<td>COOLING SYSTEM</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>AIR, IND, EXH, ENG, BRAKES</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>FUEL SYSTEM</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Session</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student 1</td>
<td>43%</td>
<td>100%</td>
<td>100%</td>
<td>50%</td>
<td>71%</td>
<td>71%</td>
<td>88%</td>
</tr>
<tr>
<td>Student 2</td>
<td>43%</td>
<td>75%</td>
<td>67%</td>
<td>0%</td>
<td>71%</td>
<td>43%</td>
<td>38%</td>
</tr>
<tr>
<td>Student 3</td>
<td>57%</td>
<td>75%</td>
<td>67%</td>
<td>50%</td>
<td>57%</td>
<td>71%</td>
<td>88%</td>
</tr>
<tr>
<td>Student 4</td>
<td>57%</td>
<td>75%</td>
<td>67%</td>
<td>50%</td>
<td>57%</td>
<td>29%</td>
<td>75%</td>
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<tr>
<td>Student 5</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Student 6</td>
<td>71%</td>
<td>75%</td>
<td>100%</td>
<td>75%</td>
<td>57%</td>
<td>71%</td>
<td>75%</td>
</tr>
<tr>
<td>Student 7</td>
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<td>67%</td>
<td>50%</td>
<td>71%</td>
<td>88%</td>
<td>75%</td>
</tr>
<tr>
<td>Student 8</td>
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<td>100%</td>
<td>100%</td>
<td>75%</td>
<td>71%</td>
<td>88%</td>
<td>88%</td>
</tr>
<tr>
<td>Student 9</td>
<td>86%</td>
<td>75%</td>
<td>100%</td>
<td>75%</td>
<td>100%</td>
<td>88%</td>
<td>88%</td>
</tr>
<tr>
<td>Student 10</td>
<td>71%</td>
<td>75%</td>
<td>100%</td>
<td>100%</td>
<td>71%</td>
<td>100%</td>
<td>83%</td>
</tr>
<tr>
<td>Student 11</td>
<td>86%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>71%</td>
<td>88%</td>
<td>100%</td>
</tr>
<tr>
<td>Student 12</td>
<td>86%</td>
<td>50%</td>
<td>67%</td>
<td>25%</td>
<td>29%</td>
<td>71%</td>
<td>50%</td>
</tr>
</tbody>
</table>

| AVERAGES | 69% | 80% | 88% | 59% | 60% | 74% | 75% |
For Steering & Suspension Systems, the sub-categories of “Alignment Diagnostics, Adjustment & Repair” and “Wheels & Tires” may need greater focus in future classes.

The top two safety violations this year paralleled last year’s results. Last year 49% of all safety violations involved lack of eye protection, this year it was 50%. Last year 38% of the safety violations involved lack of coveralls, this year it was 32%. Obviously the focus should remain on student use of eye protection and coveralls. However, this year we saw improvement as the overall number of observed safety violations dropped from 81 last year to 22 for this year.

5. Reflect on the effectiveness of this assessment tool and assessment process. Please describe any changes to assessment methodology that would lead to more meaningful results if this assessment were to be repeated (or adapted to another outcome). Is there a different kind of assessment tool or
process that the SAC would like to use for this outcome in the future? If the assessment tool and processes does not need to be revised, please indicate this.

- The use of the ASE Student Certification as an assessment is creating more interest in the ASE certification process. The exposure to the testing (which closely resembles the actual certification process) along with the student certificate itself provided incentives for students to participate. This spring was the first time we’ve used this assessment and we’re very interested in the results. At this time I see no reason to change this assessment tool.

- This spring was the second time we used the safety assessment and the first time we included the work ethic portion in the process. All of the instructors informed the students of the items that they would be graded on, so I’m sure that this influenced the results. This year (as opposed to last year) more emphasis was placed on explaining and enforcing the safety rules, which is largely responsible for the decline in observed safety violations. Next year the focus should remain on keeping students aware of the safety rules while a greater focus should be directed toward the other work ethic categories. The majority of problems regarding attendance are related to students who work full time jobs. We may try advising these students to ask their employers to make accommodations so that they can be to class on time, have more time to complete assignments and, of course, sleep.
<table>
<thead>
<tr>
<th>Diesel Service Outcome</th>
<th>PCC Core Outcome</th>
<th>Assessment Setting &amp; Method</th>
<th>When will assessment take place?</th>
<th>Degree or Certificate Assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apply skills and knowledge to repair and maintain diesel industry equipment systems to industry standards</td>
<td>CO2 &amp; CO5</td>
<td>ASE Student Certification (TSA)</td>
<td>Every Fall &amp; Spring</td>
<td>all</td>
</tr>
<tr>
<td>Apply employability skills and knowledge to seek and acquire employment</td>
<td>CO1 &amp; CO4</td>
<td>All students must take CG209. Assessment of this outcome will be done in CG209 Job Finding Skills.</td>
<td>Winter 2014</td>
<td>all</td>
</tr>
<tr>
<td>Work safely in the diesel industry.</td>
<td>CO2,</td>
<td>Classroom &amp; lab. Instructor will carry a safety spreadsheet each day and note any violations to the work ethic &amp; professionalism guidelines.</td>
<td>Winter 2014</td>
<td>all</td>
</tr>
<tr>
<td>Utilize appropriate equipment, tooling, and literature to collect, analyze, and interpret data for diesel equipment systems diagnostics and repair.</td>
<td>CO1, CO3, CO5</td>
<td>ASE Student Certification (TSA)</td>
<td>Every Fall &amp; Spring</td>
<td>all</td>
</tr>
<tr>
<td>Work ethically and professionally in the diesel repair industry.</td>
<td>CO2 &amp; CO6</td>
<td>Attendance &amp; work ethics records from each instructor.</td>
<td>Spring 2013</td>
<td>AAS</td>
</tr>
<tr>
<td>Continue education through life-long learning; i.e., four year university, industry training, ASE certifications, etc.</td>
<td>CO6</td>
<td>Contact and survey former students who have transferred to a 4 year program (MSUN). Also establish contact with representative of 4 year program and interview / survey them regarding our graduates performance.</td>
<td>Winter 2014</td>
<td>AAS</td>
</tr>
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</table>

CO1 - Communication.
CO2 - Community and Environmental Responsibility.
CO3 - Critical Thinking and Problem Solving.
CO4 - Cultural Awareness.
CO5 - Professional Competence.
CO6 - Self-Reflection.
10% of your final grade is work ethic and professionalism. Our industry tells us that regardless of a technician’s technical skill, employees who have poor work ethic and are unprofessional make undesirable employees. This score sheet helps to fairly evaluate each student and clarifies the means for evaluation. A deduction of .5% up to a full 10% can be deducted from any one area.

### Grading Area

<table>
<thead>
<tr>
<th>Grading Area</th>
<th>Percentage Deduction</th>
</tr>
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<tr>
<td><strong>Safety</strong></td>
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<tr>
<td>Safety includes working in a safe manner, wearing safety glasses when in the shop area and following the posted shop safety rules.</td>
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<tr>
<td><strong>Clean up</strong></td>
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<tr>
<td>Clean up includes individual work areas and general shop clean up participation.</td>
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<tr>
<td><strong>Use of proper tooling and service literature</strong></td>
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<tr>
<td>Use of proper service literature as instructed by your instructor and use of tooling require for the repair procedure. Avoid using adjustable wrenches and taking short cuts.</td>
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<tr>
<td><strong>Personal tools at school</strong></td>
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<tr>
<td>All students are required to have their own tools during class. Arrangements may be made for new students who have not yet received their tools. If your tools are needed at your place of employment, you are required to at least have the minimum required to complete the day’s assignments. See your instructor for clarification.</td>
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<tr>
<td><strong>Effective use of class time</strong></td>
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<tr>
<td>In a shop environment, it is expected that each hour of every day is productive. Avoid spending too much time visiting.</td>
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</table>
Respect of other students, instructors and staff

When individual conflicts arise among students, meet with your instructor to keep these conflicts from escalating.

Total deduction from 10%

Instructor’s comments:

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________
### Medium / Heavy Truck Percentile Rank Table – 2012

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<thead>
<tr>
<th>Number Correct</th>
<th>Truck Engines</th>
<th>Truck Brakes</th>
<th>Truck Susp &amp; Steering</th>
<th>Truck Elect/Elect Systems</th>
<th>Number Correct</th>
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</table>

**How To Use This Table**

A percentile is the percentage of students who scored at or below a given score point. To use the table, find the student’s Number Correct score for a given test in the left (or far right) column, and then look over to that test’s column to find the percentile equivalent. For example, if a student scored 25 correct on Diesel Engines, first find 25 in the left column. Then look to the right under the Diesel Engines heading, and you will find 66. Therefore, a score of 25 on the Diesel Engines test is at the 66th percentile of the national population of students who took this exam in the Spring of 2012.
## Appendix 5d – TSA Statistical Analysis

### TSA Statistical Analysis - Nationwide Percentile Rankings

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<th>Session</th>
<th>Student 1</th>
<th>Student 2</th>
<th>Student 3</th>
<th>Student 4</th>
<th>Student 5</th>
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</tbody>
</table>
Appendix 5e – Continuing Education Survey

Portland Community College
Post Graduate Bachelor Preparedness Survey

We would like to assess the preparedness of the PCC Diesel Service Technology graduates to enter MSUN seeking a bachelor degree. Your information will be used to help us better prepare our graduates to enter the university system.

Please circle the level of preparedness you felt you had in each of the areas below, where 10 is extremely prepared, 5 is adequately prepared and 1 is not prepared.

1. Technical content of engines.
   1  2  3  4  5  6  7  8  9  10

2. Technical content of basic electricity.
   1  2  3  4  5  6  7  8  9  10

3. Technical content of power trains.
   1  2  3  4  5  6  7  8  9  10

4. Technical content of electronic controls.
   1  2  3  4  5  6  7  8  9  10

5. Technical content of hydraulics.
   1  2  3  4  5  6  7  8  9  10

6. Technical content of mobile HVAC systems.
   1  2  3  4  5  6  7  8  9  10
7. Technical content of braking systems.

8. Technical content of steering and suspension.


10. Technical content of undercarriage.

11. Technical content of fuel injection systems.

12. Reading electrical schematics.

13. Reading hydraulic schematics.

14. Technical reading skills.

15. Writing skills.
16. Math skills. 
1 2 3 4 5 6 7 8 9 10

17. Job finding skills. 
1 2 3 4 5 6 7 8 9 10

18. Time management balancing school work, study habits, free time and employment. 
1 2 3 4 5 6 7 8 9 10

19. Practicing safe work habits. 
1 2 3 4 5 6 7 8 9 10

20. Tool and equipment knowledge. 
1 2 3 4 5 6 7 8 9 10

Please provide any additional feedback that will help us better prepare our students seeking a Bachelor degree from MSUN. Your comments and time are appreciated.

_____________________________________________________________________________________
_____________________________________________________________________________________
### Appendix 6a - Oregon Labor Market Information System (OLMIS) Employment Projections

#### OLMIS Statewide Projections for Diesel Technicians, Supervisors & Managers

<table>
<thead>
<tr>
<th>EMPLOYMENT</th>
<th>PROJECTED ANNUAL OPENINGS</th>
<th>WAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2010</td>
<td>2020</td>
</tr>
<tr>
<td>Bus and Truck Mechanics and Diesel Engine Specialists (49-3031)</td>
<td>3,776</td>
<td>4,468</td>
</tr>
<tr>
<td>Farm Equipment Mechanics (49-3041)</td>
<td>1,002</td>
<td>1,183</td>
</tr>
<tr>
<td>Mobile Heavy Equipment Mechanics, Except Engines (49-3042)</td>
<td>1,718</td>
<td>2,043</td>
</tr>
<tr>
<td>Supervisors and Managers of Mechanics, Installers, and Repairers (49-1011)</td>
<td>4,243</td>
<td>4,860</td>
</tr>
</tbody>
</table>
### Appendix 6b – Oregon Employment Department Wage Information Statistics

#### Oregon Statewide

<table>
<thead>
<tr>
<th>SOC Code</th>
<th>Occupational Title</th>
<th>10th Percentile</th>
<th>25th Percentile</th>
<th>50th Percentile</th>
<th>75th Percentile</th>
<th>90th Percentile</th>
<th>Mean (Average)</th>
</tr>
</thead>
<tbody>
<tr>
<td>47-3011</td>
<td>Brickmason's, Brickmason's, Stonemason's, and Tile and Marble Sets' Helpers</td>
<td>$1267</td>
<td>$15.66</td>
<td>$19.34</td>
<td>$22.87</td>
<td>$28.01</td>
<td>$19.70</td>
</tr>
<tr>
<td>47-3012</td>
<td>Carpenter's Helpers</td>
<td>0.30</td>
<td>10.50</td>
<td>13.30</td>
<td>16.38</td>
<td>18.00</td>
<td>15.37</td>
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<tr>
<td>47-3013</td>
<td>Electrician's Helpers</td>
<td>11.00</td>
<td>13.85</td>
<td>15.30</td>
<td>23.97</td>
<td>27.47</td>
<td>19.46</td>
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<td>47-3019</td>
<td>Construction Trades Helpers, All Other</td>
<td>9.20</td>
<td>9.92</td>
<td>13.30</td>
<td>17.65</td>
<td>24.38</td>
<td>14.72</td>
</tr>
<tr>
<td>47-4011</td>
<td>Construction and Building Inspectors</td>
<td>19.63</td>
<td>24.13</td>
<td>30.06</td>
<td>35.75</td>
<td>41.46</td>
<td>29.83</td>
</tr>
<tr>
<td>47-4021</td>
<td>Elevator Installers and Repairers</td>
<td>37.66</td>
<td>38.41</td>
<td>42.34</td>
<td>45.27</td>
<td>47.03</td>
<td>43.22</td>
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<tr>
<td>47-4031</td>
<td>Fence Erectors</td>
<td>11.50</td>
<td>15.01</td>
<td>18.77</td>
<td>21.48</td>
<td>22.94</td>
<td>17.91</td>
</tr>
<tr>
<td>47-4041</td>
<td>Hazardous Materials Removal Workers</td>
<td>12.85</td>
<td>15.43</td>
<td>19.06</td>
<td>24.05</td>
<td>29.07</td>
<td>19.51</td>
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<tr>
<td>47-4051</td>
<td>Highway Maintenance Workers</td>
<td>19.18</td>
<td>17.68</td>
<td>21.03</td>
<td>22.89</td>
<td>24.85</td>
<td>20.51</td>
</tr>
<tr>
<td>47-4061</td>
<td>Rail Track Laying and Maintenance Equipment Operators</td>
<td>18.71</td>
<td>10.72</td>
<td>23.19</td>
<td>30.13</td>
<td>34.20</td>
<td>24.46</td>
</tr>
<tr>
<td>47-4071</td>
<td>Septic Tank Servicers and Sewer Pipe Cleaners</td>
<td>12.61</td>
<td>15.66</td>
<td>20.36</td>
<td>26.12</td>
<td>36.73</td>
<td>22.63</td>
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<tr>
<td>47-4091</td>
<td>Construction and Related Workers, All Other</td>
<td>13.11</td>
<td>16.06</td>
<td>19.28</td>
<td>22.96</td>
<td>28.06</td>
<td>19.91</td>
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</tbody>
</table>

#### Installation, Maintenance, and Repair Occupations

<table>
<thead>
<tr>
<th>SOC Code</th>
<th>Occupational Title</th>
<th>10th Percentile</th>
<th>25th Percentile</th>
<th>50th Percentile</th>
<th>75th Percentile</th>
<th>90th Percentile</th>
<th>Mean (Average)</th>
</tr>
</thead>
<tbody>
<tr>
<td>49-1011</td>
<td>Supervisors and Managers of Mechanics, Installers, and Repairers</td>
<td>19.95</td>
<td>24.49</td>
<td>30.75</td>
<td>36.54</td>
<td>43.94</td>
<td>31.67</td>
</tr>
<tr>
<td>49-1011</td>
<td>Computer, Automated Teller, and Office Machine Repairers</td>
<td>11.63</td>
<td>13.41</td>
<td>16.48</td>
<td>21.17</td>
<td>25.05</td>
<td>17.50</td>
</tr>
<tr>
<td>49-1021</td>
<td>Radio Mechanics</td>
<td>15.61</td>
<td>18.30</td>
<td>22.95</td>
<td>29.33</td>
<td>34.75</td>
<td>23.78</td>
</tr>
<tr>
<td>49-1022</td>
<td>Telecommunications Equipment Installers and Repairers, Except Line Installers</td>
<td>17.46</td>
<td>23.30</td>
<td>29.51</td>
<td>33.97</td>
<td>36.18</td>
<td>27.04</td>
</tr>
<tr>
<td>49-2011</td>
<td>Avionics Technicians</td>
<td>19.50</td>
<td>24.81</td>
<td>27.27</td>
<td>29.82</td>
<td>34.33</td>
<td>26.94</td>
</tr>
<tr>
<td>49-2021</td>
<td>Electric Motor, Power Tool, and Related Repairers</td>
<td>9.22</td>
<td>5.48</td>
<td>14.70</td>
<td>20.56</td>
<td>26.63</td>
<td>15.83</td>
</tr>
<tr>
<td>49-2031</td>
<td>Electrical and Electronics Installers and Repairers, Transportation Equipment</td>
<td>18.15</td>
<td>21.36</td>
<td>28.14</td>
<td>41.83</td>
<td>45.53</td>
<td>31.07</td>
</tr>
<tr>
<td>49-2041</td>
<td>Electrical and Electronics Repairers, Commercial and Industrial Equipment</td>
<td>19.42</td>
<td>24.32</td>
<td>20.58</td>
<td>34.64</td>
<td>41.98</td>
<td>29.00</td>
</tr>
<tr>
<td>49-2051</td>
<td>Electronic Equipment Installers and Repairers, Motor Vehicles</td>
<td>11.56</td>
<td>13.75</td>
<td>16.03</td>
<td>18.13</td>
<td>20.56</td>
<td>15.58</td>
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<tr>
<td>49-2061</td>
<td>Security and Fire Alarm Systems Installers</td>
<td>18.66</td>
<td>20.13</td>
<td>23.40</td>
<td>30.00</td>
<td>34.89</td>
<td>24.58</td>
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<tr>
<td>49-3011</td>
<td>Aircraft Mechanics and Service Technicians</td>
<td>18.08</td>
<td>23.33</td>
<td>27.42</td>
<td>30.94</td>
<td>38.92</td>
<td>27.76</td>
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<tr>
<td>49-3021</td>
<td>Automotive Body and Related Repairers</td>
<td>10.64</td>
<td>15.74</td>
<td>19.27</td>
<td>23.78</td>
<td>29.79</td>
<td>20.46</td>
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<tr>
<td>49-3031</td>
<td>Automotive Service Technicians and Mechanics</td>
<td>12.76</td>
<td>15.02</td>
<td>20.32</td>
<td>25.96</td>
<td>29.94</td>
<td>20.56</td>
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<tr>
<td>49-3041</td>
<td>Farm Equipment Mechanics</td>
<td>12.04</td>
<td>15.34</td>
<td>18.06</td>
<td>21.55</td>
<td>24.40</td>
<td>18.25</td>
</tr>
</tbody>
</table>

1. Equal to the mean hourly wage multiplied by 2,080, the annual equivalent of working 40 hours per week. Note that individuals working in these occupations may or may not work full time.
2. Wages for this occupation are annual and are based on a partial or seasonal working year.
3. This occupation has a large share of part-time workers, defined as those working less than 35 hours per week. Annual wages for occupations with a large share of part-time workers may overstate actual annual income.

---

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### Appendix 6b – Oregon Employment Department Wage Information Statistics

#### Oregon Statewide

<table>
<thead>
<tr>
<th>SOC Code</th>
<th>Occupational Title</th>
<th>2013 Hourly Wages</th>
<th>2013 Annual Mean FTE (Average)</th>
</tr>
</thead>
<tbody>
<tr>
<td>49-3042</td>
<td>Mobile Heavy Equipment Mechanics, Except Engine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49-3061</td>
<td>Motorcoach Mechanics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49-3062</td>
<td>Motorcyclist Mechanics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49-3063</td>
<td>Outdoor Power Equipment and Other Small Engine Mechanics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49-3064</td>
<td>Bicycle Repairmen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49-3065</td>
<td>Recreational Vehicle Service Technicians</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49-3066</td>
<td>Tire Repairmen and Changers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49-3067</td>
<td>Control and Valve Installers and Repairers, Except Mechanical Door</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49-3071</td>
<td>Heating, Air Conditioning, and Refrigeration Mechanics and Installers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49-3072</td>
<td>Home Appliance Repairers</td>
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<tr>
<td>49-3073</td>
<td>Industrial Machinery Mechanics</td>
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<td></td>
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<tr>
<td>49-3074</td>
<td>Maintenance and Repair Workers, General</td>
<td></td>
<td></td>
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<tr>
<td>49-3075</td>
<td>Maintenance Workers, Machinery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49-3076</td>
<td>Maintenance Workers, Machine Repair</td>
<td></td>
<td></td>
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<tr>
<td>49-3077</td>
<td>Refractory Materials Repairers, except Brickmasons</td>
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<tr>
<td>49-3078</td>
<td>Electrical Line Installers and Repairers</td>
<td></td>
<td></td>
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<tr>
<td>49-3079</td>
<td>Telecommunications Line Installers and Repairers</td>
<td></td>
<td></td>
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<tr>
<td>49-3080</td>
<td>Camera and Photographic Equipment Repairers</td>
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<td></td>
</tr>
<tr>
<td>49-3081</td>
<td>Medical Equipment Repairers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49-3082</td>
<td>Precision Instrument and Equipment Repairers</td>
<td></td>
<td></td>
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<tr>
<td>49-3083</td>
<td>Printing, Vending, and Amusement Machine Servicers and Repairers</td>
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<tr>
<td>49-3084</td>
<td>Locksmiths and Safe Repairers</td>
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<tr>
<td>49-3085</td>
<td>Riggers</td>
<td></td>
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<tr>
<td>49-3086</td>
<td>Refillers, Maintenance, and Repair Worker’s Helpers</td>
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<tr>
<td>49-3087</td>
<td>Installation, Maintenance, and Repair Worker’s Helpers</td>
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<tr>
<td>51-1011</td>
<td>Supervisors and Managers of Production and Operating Workers</td>
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<td></td>
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<tr>
<td>51-2012</td>
<td>Millwrights, Tapers, and Finishers</td>
<td></td>
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<tr>
<td>51-2022</td>
<td>Electrical and Electronic Equipment Assemblers</td>
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<td>51-2023</td>
<td>Electrochemical Equipment Assemblers</td>
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<td>51-2033</td>
<td>Engine and Other Machine Assemblers</td>
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<tr>
<td>51-2041</td>
<td>Structural Metal Fabricators and Fitters</td>
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<tr>
<td>51-2051</td>
<td>Fiberglass Laminators and Fabricators</td>
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<tr>
<td>51-2062</td>
<td>Assemblers, Multi-task or Team</td>
<td></td>
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<tr>
<td>51-2063</td>
<td>Assemblers and Fabricators, All Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Equal to the mean hourly wage multiplied by 2,000, the annual equivalent of working 40 hours per week. Note that individuals working in these occupations may or may not work full time.
2. Wages for this occupation are annual and are based on a partial or seasonal work year.
3. This occupation has a large share of part-time workers, defined as those working less than 35 hours per week. Annual wages for occupations with a large share of part-time workers may overstate actual annual income.
Appendix 7 – Lab layout, Winter term.
Appendix 8 – Advisory Committee Meeting Minutes

PORTLAND COMMUNITY COLLEGE
Diesel advisory minutes 11/15/13
Called to order. 12:10

In Attendance*

*James Albright       *Bob Bonner       Mike Brown       Rick Buckingham
AJ Clarke             Mike Conley       Mike Conway      *Bob Cook
Jake Crocker          *Gary Dawson      *Brian Dilitto   *Russ Dunnington
Phil Ferris           Gary Frey        Chris Friberg    Brian Fryer
*Irene Giustini       *John Hammel      James Hudson     Debbie Hylla
*Merle Hymas          Steve Lepschat    Jaview Lopez     *Michael Maine
Randy Maine           Robert McKim     Brody Meyers     Gratia Minor
*Allen Nicks          Steve Pasley      David Pettit     *Trace Phillis
*Tyler Phillis        Bob Phipps       *Kristin Pierce  *Nancy Pitzer
Ron Schrenk           *Max Smith        Tim Snow         Derek Tompoles
*Mike Vallery          Vicki Webster-Calcagno  *Thomas Williams
*Kevin Wilson          *Steve Yager

Minutes of Feb 15, 2013 approved.

Enrollment report
Bob Bonner. Reported 94.

Industry panel feedback:
Consensus that was good panel. Discussion followed, Garry-good to talk to students was a good venue and would like to see it continued. Same format, laid out well. Timing was good as well.

TMC/OTA tech
Russ said good turnout. Discussion of the possibly of combining OTA and super tech events. Dates would be Friday OTA and Saturday super tech. If event is being hosted by PCC it would need to be in spring 1st week after finals. Max said that it is as a topic of discussion at his next meeting. The Super Tech competition is exciting and is growing hoping to mirror nationals. Anyone can compete at nationals unlike the state competition. Contact Mike Vallery 503-289-1018 Ext. 1052 mike.vallery@oakh.com or Max Smith 503 289-0900 Ext. 1404 max.m.smith@cummins.com for more information.

Update advisory list
Removal of Lowell Murray

CG209
Nancy Pitzer explained the 1 credit job finding skills. Employers come in and do mock hour Thursday February 6 1:30-3:30 interested people should contact Nancy at 971-722-7325 or npitzer@pcc.edu. Message to advisory will be sent by Nancy at the end of fall term. Advisory questioned if students ever benefited by actually getting a job? Max followed up by saying that it has been used to set up another interview. This is a great networking opportunity for students.

SODA
Kristen Pearce, Club President, is reviving the club. Possibility of using industry to connect interests of students to industry. Fundraising, peer mentoring. She offered SODA’s services volunteer at events. She can be contacted at kristin.pierce@pcc.edu.

Articulations
Montana State University Northern is being updated and PCC is currently in review of a possibility to connect with Centralia College in Washington State. If it is agreeable, students would have Jr. Standing when transferring to Centralia. The location would give students the ability to commute back and forth giving them a closer option when seeking their Bachelors.

Coop Ed
Russ, Nancy. Last year the advisory discussed coop and internships. Now we have the credit flexibility to make it work. Questions to the Advisory:

What would be the accomplishment? How many hours do you think a student would need to get understanding the basic ins and outs of that shop? Discussion as to what would coop look like; Russ and Nancy explained that students would need to be practicing what they are learning in school. Preset learning objectives are devised. Would the coop need to be three months/six months? How much time needs to be committed for the Coop to be useful? Advisory discussed that a former student was shadowing for three months three hours a day and was finally getting it. Steve said 6 Mo time frames is reasonable. Nancy said a summer capstone could be an idea. Shops are typically busier at that time giving the students more exposure. Ag west reported they are currently working with another school. They make the students go to school and then come to work and apply what they know after learning the curriculum first. Then they require them to work through the summer first and then they are offered a job. Russ stated that PCC’s idea is to add onto the
program a co-op or internship making it a requirement for graduation. Nancy also questioned if the Advisory wanted one year completed? One yr. or two year? With coop there is a checks and balances to weekly journals and conversations with students and employer. It is tied to terms here at PCC. Instructor comes to do site visit, it would be very structured. The employer can hire for the coop or intern. Students have to be supervised and mentored. 1 credit per 30 hours. Timeframe: Three months full time work is the consensus.

Gary D. Stated, He would like to see the students ready to work when graduating but right now we are training them. Faculty stated a complete engine overhaul shouldn’t be required. Gary said reasoning and trouble shooting is needed.

Nancy do you want it as an elective or a mandatory graduation requirements? The industry doesn’t have the capacity to handle that many students. So it would have to be optional. We are looking for the standouts and there aren't that many coming out of the program that are there. Can we get comment meant from the industry? Russ said he doesn't want a cop op spot to latter be filled by a hire, therefore losing the coop spot. Problem they see is that we would need to hire. The issue of unions was raised. Discussion of possible Credit elective that would be paid. Job shadow is what Max was considering, easier to do. Job shadow could see work being done and concentrated visual. Mondays are busy. Job shadow could be tied to a course. Workmanship comp is an issue. The Advisory asked that Russ give them the program outline and industry can send it to their respective HR representatives to see if it would work. This item has been tabled.

**ASE**

Tyler. Diesel program review is scheduled for January 31. 9:00 am. A reminder and invitation will be sent out. Parking will be provided. Tyler went over data. Discussion about the attendance policy. Advisory noted that the programs attendance policy needs to be stricter and more structured. In the future a copy of the student’s attendance or grades will be asked for when hiring candidates.

**Skills USA**

Desire to re-establish. Competition is usually in May. Tabled until Winter Advisory.

**Desire to learn**

On line system use as faculty. Freight line allowed us to have access to online training. Students can log in complete assignment and then go to class. Russ showed example of program. When they go to class they have already covered info. Will bring students too much higher level. We would like more of this type of access. Do you have any on line training or cd to provide us? If so please contact Russ. We want to assign homework. Copy right will be needed for posting.
Recognition of donations

**BobCAT:** Tier 4 Engines; BobCAT analyzer Software; BobCAT communication adapter.

**Anderson Bros:** Pallet of used batteries

**Sysco:** One Core-12 speed ZF Freedom Line Transmissions

Thank you for your generous donations and continued support of PCC Diesel.

**Next Meeting**
February 21, 2014

**Adjourn.** 2:07pm
Meeting Called to order at 11:59 a.m. April 19, 2013 by Max Smith, Chair.

In Attendance:

Gary Dawson  Steve Yager  Tim Snow
Randy Thrall  Chris Payne  Allen Nicks
Mike Vallery  AJ Clarke  Kevin Wilson
Max Smith  Dennis Gubbels  James Hudson
Trace Phillis  Brian VanHorn  Robert Cook
Tyler Phillis  Bob Bonner  Gratia Minor
Tom Williams  Russ Dunnington  Nancy Pitzer
Irene Giustini

Unanimous approval of the February 15, 2013 minutes as written.

New Business:

- **Introduction of new faculty:** Irene Giustini introduced new full time temp Trace Phillis to the advisor. He is teaching the brakes class, as to the fact that Gary York has called it quits. Trace went to the Oregon institute and has 23 years in the industry. Irene feels that Trace knows the value of education. The position will be open for a full-time permanent instructor, and looking to hire by the end of spring term. That will overlap in the summer and have the instructor ready by fall. We will be providing training packages to give a good base.

- **ASE Student Testing:** Gratia announced that starting September, 2013 student will be required to take the ASE testing. She was now doing a few as a pilot. The student certification testing was made by ASE with NATEF. She has had 1 student take the test while she proctored and passed. She did pass around a sample of that test but cannot be included in the minutes due to FERPA regulations. With this test it will help instructors find patterns to which they can adjust the curriculum. Currently she is evaluating exit levels. Mike Vallery inquired about the students taking a pre-test, and Gratia said she would look into it. The testing window for this year closes June 6th. This is now a new state requirement. Gratia pointed out
that the difference between a student certificate and a master tech certificate is that there is no work experience behind it. This testing is going to be a two year phase-in. Chris Payne inquired about the low requirements for scoring benchmarks, and if there were a way to run comparison test with other students across the country. Russ Dunnington had suggested that the instructors take the test to see their results and look at the benchmarks from that prospective. Chris Payne inquired about study materials for the test- and there are materials for the master certifications but nothing for this standard test. ASE has put out an 80 paged PDF with sample questions.

- **Work Ethic Tracking:** Tyler Phillis passed out a sample score sheet (which is attached). They are looking for a program outcome. The Department is trying to standardize their policy. Covers 6 items, safety being at the top, then clean up, use of proper tooling and service literature, Personal tools at school, Effective use of class time & Respect of other students, instructors and staff. They would like to compile all instructors’ figures and come up with statistics. Mike Vallery inquired if we would be giving the student updates on point counts if asked. Tyler replied that some instructors do, some do not.

- **Diesel Day:** Russ Dunnington stated that there should be around 300 students in attendance. He contacted 35 different schools. Russ asked for a list of volunteers and equipment run down. AG West – GPS Simulator TEC Equipment – Truck Chris Payne - Volunteer PAPE – Bringing something Tom Williams – Compact Tractor Cummins – Engine Module Brian VanHorn – Light Military Truck Vehicle Kevin Wilson – PPP yes Tim Snow – Working on it Steve Yager – Truck Peterson – Mini Excavator Allen – Cascadia- McCoy Bobcat – yes Anderson Brothers- transmission and Differential Clyde West – Loader

*Russ mentioned that if anyone was to bring giveaways for the students to ship it over to the tool room, they love those kinds of things. We have students that can help with anyone’s set up. And a “thank you, without you guys this would not work. Please use your influence to keep the programs in high schools”. Max Smith inquired if we were still doing the valve cover races and Russ assured that we were. We will have schedules of the event sent out when complete.

- **Recognition of Donations:** Bob Cook recognized the following companies:

  Anderson Brothers - for their donation of a pallet of used batteries.
  A Unanimous Student - a set of snap-ring pliers
  Cummins Northwest - a pallet of misc. Cummins engine parts including a turbo charger.
• **Other Business:** We are officially OTA members at PCC. Department Chairs got together to discuss Career Tech Education Panel to be done in the fall. They listed all programs and industry shares common topics. Russ asked to get topic points for students, HR employer points and culture points to get along in industries. We want to tell them how to be good employees. Russ asked for volunteers. Gary Dawson in on board, Nancy Pitzer thinks it is a great idea and that hearing from industry will make it stick.

Bob Bonner did a pole in his class and 1/3 of the students came to Diesel Day, and announced that there will be 18 graduates this spring.

Nancy Pitzer sent out a thank you to those who participated in the mock interviews.
Max Smith announces that students can participate in OTA now. They have a discounted rate for them. And he was pleased with the good presence of students to the last showing.

**Meeting Adjourned:** 12:47 p.m.

**Date of Next Meeting:** November 8, 2013.
PORTLAND COMMUNITY COLLEGE  
Diesel Service Technology  
Advisory Committee Minutes for February 15, 2013

Meeting called to order at 12:04 p.m. February 15, 2013 by Max Smith, Chair.

In Attendance:

- Dennis Gubbels
- Tyler Phillis
- Kevin Wilson
- Irene Guistini
- Tom Williams
- Mike Vallery
- Teri Rodriguez
- Patrick Lanz
- Gratia Minor
- Gary Dawson
- Kristin Pierce
- Max Smith
- Robert Cook
- Dean Moyer
- Nancy Pitzer
- AJ Clarke
- Chris Payne
- Randy Thrall
- Gary York
- Allen Nicks
- Russ Dunnington

Unanimous approval of the November 7, 2012 minutes as written.

New Business:

- **TSA’s - Technical Skills Assessment/Student ASE Testing:** Tyler explained that TSA’s are required to receive Perkins Funds. We are to assess outgoing skills of the graduates. This is the 1st year this has been required. We report the results to the State of Oregon. The Department chose to purchase the ASE assessment software through NATEF. It is computer based and on-line. The testing is engineered for students with little or no experience with ASE. Students will receive a certificate that is good for 2 years. It can be a good resume builder for the students and a useful tool for potential employers. Students are required to take it but not required to pass it. This will take place for the graduates of winter term. Cost is $15 to the student for the testing block. Tyler emphasized that this will need to be place into the catalog still.

- **Diesel Day:** Russ mentioned that Diesel Day is coming up on May 3rd from 9-2. It is a day when our students become trainers to 250-400 High school students; we have been doing so for 13 years. There are 25-30 stations, a barbeque, valve cover races and door prizes. We provide transportation for schools that do not have the funding themselves but are interested in attending. We would like to thank Tom Williams from Metro New Holland, Patrick Lanz from AG Equipment, Gary Dawson from TEC Equipment, Max Smith from Cummins
NW, and Chris Payne from Northside Ford for volunteering to participate in Diesel Days. We please encourage more of the industry to bring products and props.

- **NATEF Review:** Russ asked that the Advisory help rate us for our NATEF review. Ranking us from 1-5 on standards 1-9. We handed out the report put together reviewing the standards and did tours of equipment, shops, and the library resources for the students. A big thank you to everyone who helped and participated in this review.

**Donations:** Bob Cook recognized the following companies:

- **DAIMLER TRUCKS NORTH AMERICA**- A box of heavy duty clutches-steering gear; large fuel filter assembly. Disc brake rear air cans- and an axle bearing stand.
- **ANDERSON BROTHERS TRUCK PARTS**- 2 OTC engine revolvers with adapter plates and brackets
- **CUMMINS**- Two In-Site programs for our computers.
- **OAK Harbor Freight Lines**- Huge box of core starters and alternators.
- **A Student**- donated an exhaust emissions component.

We could not do it without your generous donations! Thank you for your continued support of our program.

*We are in need of: starters and alternators, common rail, after treatment devices, any updated break system, electronics and engine rebuild stuff. It does not need to be operable. ECM’s from McCoy Freightliner.

**Other business:**

Max passed out a flyer for upcoming OTA events. Cummins is having a 2 hour training on their on-line resources. The cost is $10 for students.

Max addressed the SODA reps. about getting the students involved in this as well as the SODA Super Tech Competition.

Max also mentioned the possibility of an ATA Professional Tech Scholarship being available for the students.

Nancy Pitzer sent out a big thank you for all of those who have volunteered to help in the mock interviews coming up next month.

**Meeting Adjourned: 1:35pm**
**Date of next meeting: Friday April 19, 2013.**