

A background image featuring a central burst of bright, multi-colored sparks (yellow, orange, and blue) radiating outwards against a dark blue gradient. The sparks create a sense of motion and energy, typical of a welding process.

# WELDING TECHNOLOGY

## Program review

***Welcome to PCC Welding***

**Section 1**

**Program/Discipline Overview:**

**A. What are the educational goals or objectives of this program/discipline? How do these compare with national or professional program/discipline trends or guidelines? Have they changed since the last review, or are they expected to change in the next five years?**

A. The goal of the Welding Technology program is to serve the community at large. The welding industry is experiencing a severe shortage of qualified welders. Industry demands in respect to quality and quantity are increasing and are projected to continue increasing.

Portland Community College has the largest academic welding training facility in the Northwest. The program is the hub of welding technology for the Portland metropolitan area with its primary training facility at the Rock Creek Campus. PCC also has training centers at Swan Island, and St Helens High School. Welding courses in support of the HVAC program at the new Trades center have started. The welding program prides itself on its unique and responsive instructional design which provides maximum **access** for our community. The program has an open-entry open-exit (OE/OE) instructional format to respond to the needs of the students, business and industry and the community at large.

Open Entry/Open Exit: What is it?

The Welding Technology Program has been developed specifically as an Open-Entry and Open-Exit (OE/OE) program with all lec/lab courses being offered concurrently. Welding is designed to fit the needs of the student (take as few or as many courses as desired), and have the following characteristics:

- Open entry (enter at any time during the term)
- Flexible (select students own attendance schedule)
- Individualized (a program can be tailor-made to fit specific needs)
- Open exit (leave the program when student has met training goals/needs)

The OE/OE structure makes it possible for us to serve the wide variety of rapidly changing industry and community needs.

- Each credit hour equals 20 clock hours in the lab. Students may attend full time or part time, registering from one credit to 12 credit hours.
- Instructors manage their class loads to provide a minimum of 15 students attending daily and a maximum of 20 attending daily.
- All lecture lab courses, degree, upgrading and individualized are offered concurrently each term.
- Welding offers lifelong learning opportunities by having “two roads” in the program. There is a degree/certificate seeking path as well as an individualized training path for the students who wish to upgrade their skills.
- Students are called in from the prospective student list based on instructor student ratio and equipment availability. Space becomes available when a student completes their goal and leaves.
- A student may enroll for one class that is completed within 3 weeks. The same student may enroll in 3 or 4 classes, taking the entire term. In this type of program, “open entry/open exit”, spaces become available during the term for other students to enroll.
- This allows students to customize their training; they are not tied into one type of welding technique.

**Welding Technology Program Mission**

- Provide instruction for all students who want it need it and will profit from it.
- Instill in the students a sense of pride in their work ethics, their work and their work place.
- Maintain facilities and equipment to provide an atmosphere that is safe and consistent with current industry needs.
- Coordinate the resources and services provided by the college to insure that all students may take full advantage of the benefits available to assist them in their education.
- Provide for the development and growth of partnerships with local secondary and post secondary schools, industry, union and non-union apprenticeships, other PCC programs, and The American Welding Society and other related professional associations.
- Insure that the program and instructional materials include; current technical applications and information.
- Conduct ongoing systematic program self-assessment and improvements.
- Develop, review and revise course content guides and instructional materials as needed to remain current with industry needs and standards.
- Purchase equipment and instructional materials that insures the students training experience meets the current labor market needs.
- Utilize the input and support of our advisory committee.
- Provide the opportunity and support for continuing professional development for faculty and staff
- Be responsive to individual, industry, and the community needs by maintaining flexibility and as variety of course offerings and schedules.

**B. Briefly describe changes that were made as a result of SAC recommendations and/or administrative responses from the last program review.**

- B. Over the past five years there have been no major industry changes that would require the department to initiate major changes in our curriculum other than increasing training hours. However, the welding industry is experiencing a renewed interest in nondestructive testing and inspection course work so we are looking into reactivating these courses and possibly creating a new NDT short term certificate.

An instructor training program has also been a topic of discussion given the growing shortage of Instructors. Currently, we have been very fruitful in mentoring our part time instructors. The changes made as a result of the last review include increased offerings, new locations, increased part time faculty. The development of the short term certificates. Completion of bond upgrades to lab.

## Section 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: The College has an expectation that course outcomes, as listed in the CCOG, are both assessable and assessed, with the intent that SACs will collaborate to develop a shared vision for course-level learning outcomes.**

**i. What is the SAC process for review of course outcomes in your CCOGs to ensure they are assessable?**

A. Upon recent review of our CCOGs it became apparent to our department that our CCOGs were full of inconsistencies, anomalies and artifacts. The timing of this discovery coincided with our SACs desire to change from three credits per class to four to increase student success. We then embarked on a mission to correct and improve every CCOGs starting with Associate of Applied Science degree.

The Welding Department meets every Friday for a staff meeting which ostensibly is a SAC meeting. Because we meet so often as a group it makes housekeeping and the successful completion of large projects fairly painless and workable. Our process has been to divide the CCOGs amongst the full time faculty making each instructor responsible for four to six CCOGs. We then worked as a group to create a boiler plate document that each instructor could work from to ensure we were using similar format and wording. We each then individually corrected the CCOGs we were responsible for, making changes in Course-Leaf and saving changes as we went. Lastly we met as a group and combed through each line of each CCOG to see if it is written correctly and that our outcomes as written are assessable. "Is it assessable?" and "do we assess it?" was our mantra and we completed all of the CCOG's for the associate degree in this way. Dividing the work equally and coming together as a group for final polish is our process and we will continue in this manner through the CCOG review schedule.

**ii. Identify and give examples of changes made in instruction to improve students' attainment of course outcomes, or outcomes of requisite course sequences (such as are found in MTH, WR, ESOL, BI, CH, etc.) that were made as a result of assessment of student learning.**

B. The major change currently in process is increasing lec/lab courses from three to four credits to provide more time for students to successfully master skills to meet course outcomes and industry standards. The Welding Department reviewed failure and non-completion rates of all classes over a five year period. The data showed what all instructors suspected, that classes that were four credits had a significantly higher pass rate than those classes that were only three credits. It was decided by the SAC and with input from our advisory committee that our students would benefit greatly if more time is devoted to each class. The increase from three credits to four credits gives each welding student approximately 20 more contact hours per class. This increase in time will increase our student's ability to attain the prescribed outcomes for each class and make them more competitive when they enter the job market.

An additional example of changes made due to the assessment would be our norming session. In the course of our assessment we noticed slight differences in how grading was being applied to code quality work. We decided a norming session would be beneficial for the instructors and our students. In the norming session full time faculty graded projects and each discussed their

approach to the grading process. It was shown that we enjoyed slight variations in approach but were very consistent in our results.

### **Addressing College Core Outcomes**

**i. Update the Core Outcomes Mapping Matrix.**

<http://www.pcc.edu/resources/academic/core-outcomes/mapping-index.html> For each course, choose the appropriate Mapping Level Indicator (0-4) to match faculty expectations for the Core Outcomes for students who have successfully completed the course. (You can copy from the website and paste into either a Word or Excel document to do this update, and provide as an Appendix.)

See Appendix #1

### **For Career and Technical Education Programs: Degree and Certificate outcomes**

**i. Briefly describe the evidence you have that students are meeting your Degree and/or Certificate outcomes...**

PCC has developed and streamlined an assessment process to meet accreditation requirements. The main thrust of this process is to insure that our students are achieving College Core Outcomes, outcomes specific to a degree and the individual outcomes as described in each CCOG associated with the program. For our assessments we have focused on our AAS in Welding Technology. Over the past few years we have made our way through our chosen AAS outcomes and now at the point of re-assessing some of the outcomes.

The assessment process has shown that our students are meeting our degree and certificate outcomes. Each assessed outcome came with favorable results and positive peer reviews. The data for the assessment is taken from the final rubric which is included with the final project for each course. Our outcomes are measured from these rubrics. The majority of students that complete a course were meeting our outcomes. What we also discovered was that a students' failure to complete a course could be attributed to their difficulty in completing assignments within the allotted and relatively short time frames.

**ii. Reflecting on the last five years of assessment, provide a brief summary of one or two of your best assessment projects, highlighting efforts made to improve students' attainment of your Degree and Certificate outcomes**

Our best assessment project we have worked on in the last five year cycle was rewriting every one of our AAS CCOG's. Within the assessment project is the clear directive to make sure that all outcomes are assessable and that we are assessing these outcomes. As part of our three year CCOG review cycle we discovered some

problems had occurred with many of our CCOG when they were migrated to Course-leaf. Instead of just correcting the omissions and anomalies, we decided to go through all of our CCOGs and look at them through the lens of assessment.

In addition to re-writing CCOG's we are in the process of changing all three credit welding classes to four credits to improve student attainment of skills and degree and certificate outcomes.

The change from three credits to four credits allows for an increase of approximately 20 contact hours per course. These additional hours will allow students to better develop the skills required for success in industry and allow a more reasonable amount of time to complete coursework.

Part of the Assessment process involves making sure data is consistent from one instructor to the next. In the reporting itself each SAC is asked if inter-rater reliability has been measured and insured. To this end, we held a norming session in which all full time faculty participated. In the norming session we were given examples of student final practical exams and were each asked to grade these examples. The Welding Department utilizes a rubric for final exams and a standard welding code is used in a visual examination of these finals.

The results of the session were very positive. Because we are using a rubric and a standard code there is very little room for subjective interpretation of results. Most scores were the same or nearly the same for each instructor. Though our results were very similar there were small differences in how we interpreted the rubric. We debated these interpretation and came up with a single method of approaching the final rubric that all instructors will use. We believe this has further ensured equitable grading across all shifts and instructors, benefiting both student and faculty.

**iii. Do you have evidence that the changes made were effective (by having reassessed the same outcome)? If so please describe briefly....**

In the assessment cycle we have re-assessed Critical Thinking, Problem Solving, and Professional Competence. Data for these three outcomes was gathered from the final rubrics of a single welding course. In the first assessment of these outcomes we predictably had excellent results and no changes were made to improve these outcomes. These outcomes are very easily assessed and are generally the greatest strengths of many of our students.

**iv. Evaluate your SAC's assessment cycle processes. What have you learned to improve your assessment practices and strategies? –**

The assessment cycle has become a helpful process we engage in each year. During this cycle we assess all AAS welding outcomes. The Welding SAC has evenly divided and assigned these outcomes among the full time faculty. That faculty member is responsible for completing the assessment for their assigned outcomes as they makes their way through the assessment cycle. Instructors provide data to the author and we review the results and make changes as necessary before submitting our Assessment Report.

We have learned that by utilizing our assessment coaches we can improve our practices and strategies. Our assessment coaches have been very helpful in making the assessment process understandable and guiding us through the process. Assessment coaches have been instrumental in finding ways to assess difficult to align

outcomes. Our coaches have also been very helpful in keeping up with the many changes that have been made as the assessment project has evolved.

**v. Are any of PCC's Core Outcomes difficult to align and assess within your program? If yes please identify and explain.**

In our CTE program students come into our courses and practice skills until they reach a level of proficiency whereby they can move on to more advanced levels of training. This process is very personal and does not expose the student to community and environmental responsibilities. The exception to this is that all PCC Welding students take part in recycling all welded material but we have no way to map this for proper assessment. The Self Reflection core-outcome would be assessable without the wording "personal beliefs and how they impact others."

Below are the Outcomes which are difficult to align.

***Community and Environmental Responsibility***

*Apply scientific, cultural and political perspectives to natural and social systems and use an understanding of social change and social action to address the consequences of local and global human activity.*

***Cultural Awareness***

*Use an understanding of the variations in human culture, perspectives and forms of expression to constructively address issues that arise out of cultural differences in the workplace and community.*

***Self-Reflection***

*Assess, examine and reflect on one's own academic skill, professional competence and personal beliefs and how these impact others.*

### **Section 3**

#### **Other Curricular Issues**

- A. Which of your courses are offered in a Distance Learning modality (online, hybrid, interactive television, etc.), and what is the proportion of on-campus and online? 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 addressing or how will you address these differences? What significant revelations, concerns, or questions arise in the area of DL delivery?**

None at this time.

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

None at this time.

- C. Are there any courses in the program offered as Dual Credit at area High Schools? If so, describe how the SAC develops and maintains relationships with the HS faculty in support of quality instruction.**

Yes, we have eight of our requisite courses being offered at six area high schools with 48 total students participating. The SAC maintains relationships by having annual meetings with our High School faculty to discuss our curriculum. Additionally we've held training sessions with the HS instructors in which we've taken

them through the welding certification process. As a result many of the instructors have obtained welding certifications for the processes they teach to increase their own qualifications in teaching our welding classes.

- D. Please describe the use of Course Evaluations by the SAC. Have you developed SAC-specific questions? Has the information you have received been of use at the course/program/discipline level? Our instructors' use course evaluations on an individual basis. Each instructor evaluates the student's responses to the Course Evaluations to determine their particular pedagogy is well received.**

The Welding SACC has not developed specific questions, however we do find the generic questions provide the necessary feedback.

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

Since the last program review the Welding Faculty have been working on updating our CCOGs, creating new courses, we've added multiple short term certificates, and expanded our Swan Island training facility.

The main rationale for updating our CCOGs was to increase the credits for our core requisite classes from 3 to 4. This will allow the student more time to master the skills necessary to thrive in their subsequent courses.

The courses that were created are in response to advisory committee feedback. Industry is the driving force behind our curriculum and we greatly value the input from our advisory committee. In response to feedback from our last two advisory committee meetings we've created courses that will better prepare our students for jobs that are currently available. For example we've incorporated more Carbon Arc Gouging and out of position welding into our projects to better prepare our students.

The creation of our short-term certificates was in response to our poor student completion rate. These certificates not only signify the student's competence in a specific weld process, they also bundle toward the AAS or Less than one year degree. The Welding Dept. definition of completion was for the student to get the training necessary to go and find a job. Our curriculum supports the student that wants to develop skills in one particular welding process in order to go to work. However, this model did not support completion. Hence, we developed short-term certificates to capture the students' benchmark achievements.

Our Swan Island facility is a huge asset for welding students on the east side. PCC's partnership with Vigor Marine and the shipyards provides students with a genuine perspective of a highly functioning industrial setting. As a result of this partnership we've had over 50 of our students that have gone directly from PCC Welding to working for The Shipyards.

## Section 4

### Needs of Students and the Community

- A. Have there been any notable changes in instruction due to changes in the student population served?**

Over the past five years there have been no notable changes in the student population other than growth. In essence, the Welding Program has doubled in size and has sustained that enrollment for this past assessment cycle. The Welding Department has responded to the growth by increasing the number of shift offerings. Below is a matrix which details the shift offerings.

Shift	Instructor #1	Instructor #2
RC – Mornings - 7AM to 12PM	Matt Scott	Lauren Cobb/ Danny Merrick
RC – Mid days -12 PM to 5PM	Liberty Olson	Kirk Ebberts/Danny Merrick
RC – Evenings – 5PM to	Connie Christopher	Kevin Longueil

<b>10PM</b>		
<b>RC – Fridays – 7AM to 12 PM &amp; 12PM to 8PM</b>	Dave Williams	Scott Judy
<b>Swan Island – Mid days 12PM to 5PM</b>	Mike Rasmussen	N/A
<b>Swan Island – Evenings 5PM to 10PM</b>	Kane Heidecker Bruce Mulligan	N/A
<b>St Helens HS –Evening 6PM to 9PM</b>	Lucas Briggs	N/A
<b>Newberg HS --</b>	Not offered yet, however, in 2010 PCC teamed with Newberg school district to rebuild their high school weld shop to expand PCC offerings at high school.	N/A

**B. What strategies are used within the program/discipline to facilitate success for students with disabilities? What does the SAC see as particularly challenging in serving these students?**

Welding works closely with the Office of Disability Services to enhance the students' educational experience. Once the faculty member receives an accommodation letter, we work with the student on a one-to-one basis to ensure his/her success. This is a team approach where the faculty member will coordinate with other team members including our Learning Skills Specialist/Advisor, Instructional Technician and other stakeholders as appropriate. The team then assists the student throughout his/her coursework. This may include referring the student to the learning Skills Specialist for additional targeted tutoring. In addition, some of the Welding faculty have been piloting the use of D2L to support student success. This is an excellent program where the students can track their grades, locate instructional materials and lesson plans and other supplemental information to support the student's educational needs.

The primary challenge for instructors, when working with students with special needs, is that the instructor will often find it difficult to give the time and attention required for those students to be successful while still meeting the needs of the rest of the class. For instance, assisting a student with a mathematical lay out problem can require an abundance of time if the student does not have basic math skills, and given the demands of the entire class, the instructor may not be able to devote the necessary amount of time.

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

Welding uses several sources to sculpt its curriculum. Local leaders that serve on our advisory committee have proven to be an excellent resource. For example, Fought a local structural steel company, suggested using 3/32" E70T-1 electrode to have our students' ramp up their training by welding out two foot long T-Joint sections to prepare them for the real

world. Welding has found that information helpful, and has implemented it. Consequently, Welding has been able to place several students at Fought and Canron Structural Steel companies successfully.

Another example of implementing our stakeholder's advice is Welding's Capstone class. Capstone is the final class in program designed to bring all the student's skills together that she/he has gained throughout the course of his/her educational experience at PCC. The class contains the following bench marks, as suggested by stakeholders, to determine if the student is job ready.

- Completion of a complex fabrication project. It is here where the student designs and builds a product that is of the complexity he/she will face on the job.
- The student develops a power point presentation detailing the fabrication projects steps. This assignment has a twofold purpose. 1) Provide an opportunity for the student to gain valuable public speaking experience. 2) It also provides the opportunity for the student to reflect back on problems and solutions she/he had during the fabrication process and how to solve such difficult challenges.
- Comprehensive written exam – a 136 question exam covers subjects from day one throughout the entire program to ensure the student's general knowledge in welding.
- An offsite weld test. Rock Creek welding students go to Swan Island Training Center (and vice versa) to take a vertical FCAW weld test. The idea here is to place the student in a real world situation. At this point in his/her curriculum the student has taken several shop tests in a familiar environment. Therefore, the idea of sending students outside of their comfort range is to purposefully put them in another environment to experience a new testing atmosphere so they can be successful after graduation.
- Student Portfolio - The idea of a student portfolio has been a key to our students' success. As our students enter our program many times they come in with no experience as they are seeking to change their careers. Although they secure the needed skills to be gainfully employed while in our program, many times companies are hesitant to hire them because of their lack of experience. However, when the students present their portfolio the old saying of "a picture is worth a 1000 words" comes into play. The employer sees firsthand that the students at PCC do more than just weld 6 inch long plates and are ready to be productive. Hence, our students have been successful at securing employment, and in a few cases some students started at a higher wage because of the work they presented in their portfolio.
- An outside interview – The student interviews with Madden Industrial Craftsmen, Inc. to provide a real life experience. This process gives the student objective feedback regarding this/her interview skills as well as a potential job if the student does well in the interviewing process. .

These are just a few examples that help separate PCC Welding from other welding schools. By listening to the external stakeholders, our students have realized success in the welding industry.

## Section 5

**Faculty: Reflect on the composition, qualifications and development of the faculty**  
**Provide information on:**

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

The Welding Department currently employs three female instructors. These women are highly skilled and deliver high quality instruction in a male dominant workforce.

The key element of having very skilled female instructors is the hope that Welding will also see an increase in female students. However, as seen by the following graphs, our stats have declined slightly in this category over this past program review cycle.

Welding				
COLLEGEWIDE TABLES (Excl Campus 6 & HS dual credit): Gender Distribution			Female	Male
		N	%	%
Collegewide, Excl Campus 6				
	2012-2013	529	8.9	91.1
	2013-2014	539	8.7	91.3
	2014-2015	525	8.6	91.4

  

Welding				
COLLEGEWIDE TABLES (Excl Campus 6): Gender Distribution			Female	Male
		N	%	%
Collegewide, Excl Campus 6				
	2007-2008	335	11.0	89.0
	2008-2009	346	12.1	87.9
	2009-2010	337	9.8	90.2

By nature welding has a very diverse student body since it fits into many different trades and has a shorter training cycle for a student to become gainfully employed. Welding also increases its student body diversity by running individualized training classes. It is here where the experienced student or the hobbyist can utilize the welding shop to improve their skills. This program has also been the vehicle for some of our students to change from the individualized portion of our program to the degree side of the house.

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

Over the past assessment cycle, Welding has worked with Irene Giustini to revamp the instructor qualifications. This happened during an increase in enrollment where Welding was searching for additional faculty to open more classes. To fill the need, Welding identified specific skill sets required to teach classes. The collaboration among the faculty, division dean and HR Department proved to be very beneficial because we were able to breakdown key subjects and tie specific qualification skills sets to identify qualified individuals to teach these classes.

As seen in our “new” instructional qualifications, Welding was able to identify specific skill sets to classes that instructors are qualified to teach. The link to the instructor qualifications:

<http://www.pcc.edu/resources/academic/instructor-qualifications/wld.html>

The revised instructor qualifications are in contrast to the old qualification as seen here.

<http://www.pcc.edu/resources/academic/instructor-qualifications/WLD-WeldingInstructorQualificationsARCHIVE.html> Hence, the new qualifications allows the flexibility to hire qualified part time instructors to open more sections of welding.

In addition to reviewing the welding certification requirements, Welding has also reviewed and revised the requirements for teaching. Examples of these requirements are: more emphasis on a large group lecture/demonstration as part of the hiring process and require a broader background in math and writing. This is an important aspect because there is more to teaching welding than individual demonstrations in a welding booth.

**C. How the 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.**

During this past review cycle the college has supported the faculty in several ways. First is the standard OSHA Training and First Aid and CPR training, as well as other seminars made available by the college.

The College also supported two faculty members by sending them to an American Welding Society's Welding Inspection seminar. This is a nationally recognized organization that governs the welding industry. By attending the seminar the two faculty were able to learn the new code requirements and be tested on that information to earn their welding inspection license. This is a nationally recognized license that now 5 faculty members hold.

The faculty participants were able to return to the classroom and share the new requirements that they learned at the seminar. This collaboration has allowed the other faculty to start incorporating the new requirements set forth by the national code.

## **Section 6**

### **Facilities and Academic Support**

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

Welding's two classrooms (132a and 132b) have recently had the center wall removed. The removal of this wall gave the Welding Department one large classroom that can be split in to two classes when needed. This remodel was a big help and the large classroom is in constant use. However, classroom space for our lecture classes continues to be an issue.

Out on the welding shop floor, machines are moved from one place to another to accommodate the constantly changing needs of the students, and to overcome electrical breakers that will trip once work peaks in the fab bay. The electrical problem was addressed in the bond but did not fully cure the problems with the breakers. The tool room technician's increased the size of the wires being used in the welding machines and bought smaller grinders to help to offset the electrical problems. This fix has helped, but the problem does still exist.

The welding media classroom is very important to the success of the welding students. A new student coming into the Welding Technology Program will start their training in the media lab by watching safety videos before they ever set foot in the welding lab. Students already in the program will go to the media classroom to watch videos of the next welding process they are about to

experience in the shop. Welding lec/lab students wanting to watch training videos often interrupt the other students in the classrooms.

Considering the importance of this one room to the success of the welding students, it would be in the student's best interest to have a schedule of continuing equipment up-dates in the media room.

The need to enlarge and upgrade the welding facility at Rock Creek is fast becoming critical. The Welding Technology Program has the ability to run three shifts per day with two instructors on each of those shifts it makes sense to fully staff all of those positions and modify the facility to accommodate the community need.

1. Classrooms:

- a. Identify additional classroom space for welding 101 (Welding Process and Applications), welding 102 (Blueprint Reading for Welders) and welding 203 (Structural Steel Welding codes).

2. Lab

- a. Fully staff all available shifts with full time instructors.
- b. Make necessary electrical upgrades to accommodate newer equipment.
- c. Add an overhead crane to the Fabrication Bay

**B. Describe how students are using the library and other outside the classroom information resources.**

Currently the Welding Technology Program utilizes the library as a reference resource. Extra copies of textbooks are put into circulation and the American Welding Society has donated their technical collection which is in the reference portion of the Library.

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

It is a full time job for a welding instructor to manage the paperwork part of class, not to mention the teaching aspect. Due to this unprecedented growth of the welding program over the past decade, and the continued expansion of welding into other counties, it make sense to dedicate a full time learning specialist to the program allowing the welding instructors more time with their students.

Hiring a full-time learning specialist support person to work full-time with the welding staff would increase our effectiveness as a program. This learning specialist and support staff would assist the department in advising assistance, scheduling, tracking, waitlist management and follow-up with students. A Learning Specialist supplied by Perkins Funds help students with embedded instructions including, but not limited to, math and reading. The Learning Specialist is also able to help the students navigate through the confusing financial, Trade Act, VA or other government funding agencies.

**C. Provide information on how advising, the office for students with disabilities and other student services impact students.**

New welding students coming into the program are spending more time with the welding learning specialist than they have in the past. This encourages the students to begin their general education classes. Once a student has taken his/her placement testing and knows where to start classes, he/she will see advisors and tutors if they require help. The learning specialist staff helping the Welding Technology Program in this area are stretched thin and serve other departments as well as welding.

## **Section 7**

**A. Evaluate the impact of the advisory Committee on curriculum and instructional content methods, and/or outcomes.**

- Our welding program stays current with industry needs through an active Advisory Committee made up of representatives from local businesses that regularly seek our graduates for employment
- Our Advisory Committee gives us insight on welding positions and process availability due to economic conditions in our local area
- Our Advisory Committee provides input on outcomes our students need to be successful
- Committee advises us on recommended equipment to purchase
- Committee advises on skills needed in the workforce and thus improves the quality of products while enriching the community with highly trained graduates
- Committee has listened to what other industry needs are for new courses that we should look into for development
- Committee gives us input into the development of curriculum
- Employer and student feedback to the department that students are meeting the established program outcomes

**B. Describe current and projected demand and enrollment patterns**

The Welding Technology Program is based on performance outcomes (nationally recognized criterion). The current and future demands for welders are driving more individuals to the welding program, creating the need for a prospective student list for both the Rock Creek and Swan Island facilities. The welding department sees no immediate change in this. In fact, with the large amount of retirements in manufacturing, occurring over the next 10 years, the welding program is seeing an increased demand from both local and national companies for skilled welders. Skilled welders are a key labor component for manufacturing companies and, locally, there is a shortage of well- trained workers in this vital trade. Companies such as Gunderson, Fought, Vigor Fab, Vigor Marine, Canron, and Oregon Iron Works, have the potential to expand their workforce by taking advantage of the training opportunities that Swan Island Training Center and Rock Creek provide.

**C. Explain how students are selected and/or prepared for program entry**

With limited equipment and space, students must first register on the prospective student list. As an OE/OE program, the Welding Department allows a student to start classes at any time during the term, provided there is adequate time to complete a class. While on the prospective student list (waitlist), students are encouraged to take the WLD 101, Weld Processes and Applications, and WLD 102, Blueprint Reading prior to beginning the shop classes.

**D. Review job placement data for students over the last five years, including salary information where available. Forecast future employment opportunities for students**

Welding technology is a Career Technical program training our students to enter into a diverse career field. Whether it's a new career in the ship building sector or working as a welder fabricator in a small shop, the Welding Program prepares students to successfully compete in the competitive job market. **See Appendix #2 for a list current employers employing current and former PCC students who are succeeding in the workplace.**

The Welding Technology Program currently holds files on past welding students, going back 5 years. These files hold a wealth of information on past students that could be put into a very valuable database. Tracking students is still an issue. The Welding Technology Program and the Institutional Effectiveness Department of PCC are working to develop a mailer to track Certificate and Associate degree Graduates. The Welding Technology Program needs additional funding to establish our own database of students that are now working as welders and where they are working.

With retirement age of welders now starting, the demand for welders is outpacing the supply. Students completing training can become employed immediately. The American welding Society is predicting this trend to continue for years to come.

**E. Analyze any barriers to degree or certificate completion that your students face, and identify common reasons that students may leave before completion. Data on the number of students completing Degree(s)/Certificate(s) See Appendix #3**

The following is a list of typical barriers for students to complete a certificate and/or degree:

- Full-time faculty are needed at Rock Creek to best use instructional space
- Full-time faculty are needed at Swan Island to meet demand
- Students require more class time to perfect their skill set. Faculty are currently working on a plan to increase class time
- Financial resources are limited
- Family demands
- Emphasis on Skills Upgrade, not seeking a degree, need job specific skills for advancement
- Employers recruiting students
- Work demands (Mandatory overtime)

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

The Welding Technology Program offers multiple advanced classes for returning students to further their skill set. Classes are offered continuously and at times convenient for student success. Students may continue their education and receive a Bachelor of Associated Science through Oregon Institute of Technology (OIT) and/or Southern Oregon University (SOU).

## Section 8

### 1. What is the SAC planning to do to improve teaching and learning, student success, and degree certificate completion?

Student access and student success are the things that drive our college and our department.

Our open entry/open exit model provides the most flexibility and access to our student and industry. Because our instructors can teach any welding class at any time we are able to meet industry needs at a moment's notice and provide the most access to our student that any model can provide.

Student success is well within our means as instructional staff but providing more access will require help from administration. We would like to add a much-needed third shift to Swan Island, continue to grow the St. Helens program, and start the stalled Newberg program. The infrastructure is in place. Presently all students completing the welding program can obtain employment if they so desire. The pay range for welding jobs is approximately \$17-\$35 per hour with medical/dental added to that. Each new shift we add in the welding program can accommodate up to 25 new students, multiply that across Swan Island Newberg and St. Helens and we would be greatly increasing access to these communities and changing many more lives.

As mentioned above our SAC has been working hard to improve student success and degree and certificate completion. With the creation of our short-term career pathways certificates our completion rate has risen dramatically. We are confident also that when we increase our three credit hour classes to four credits that this will have a positive effect on student completion and student success entering the work force. The SAC is also in the process of adding a Less Than One Year that utilizes any group of lec/lab courses for completion. We are also in the process of increasing our Fabrication welding offerings to better prepare our students for the workforce.

The Welding SAC is in the process of changing all classes to four credits. Student success in current four credit classes is noticeably greater than three credit offerings. With the knowledge that our student needed more time in class to be successful we poled our advisory committee as to their thoughts on giving students more time in each process. The consensus was that this was a no brainer and that we should go forward with our plan.

The Welding SAC is also working on a Less than one year that will use any group of welding classes for completion. The current Less Than One Year is limited to the Stick and Wire Feed processes. We feel that any welding course is just as valuable as another so we are proposing that a student need only meet a credit requirement to receive the LTOY and not be bound to a particular progression or chronology. This would allow a student to be exposed to GTAW, pipe welding, fabrication, oxy-fuel, and any other path a student may be interested in.

With guidance from our advisory committee we have embarked on creating two additional fabrication classes. When asked what new employees are most lacking in, our advisory committee agreed that knowledge of basic shop tools and fabrication techniques was something that most incoming employees were in need of. This led directly to the creation of our new fabrication classes and guided our creation of the CCOG's for these new classes and our revisions of current fabrication CCOG's.

**B. What support do you need from the administration in order to carry out your planned improvements? For recommendations asking for financial resources, please present them in priority order. Understand that resources are limited and asking is not an assurance of immediate forthcoming support, but making the administration aware of your needs may help them look for outside resources or alternative strategies for support.**

Continue growing the St. Helens program. Portland Community College started a welding program at the High School in St. Helens 3 years ago. The yearly average number of students in that program has been approximately 10 students. This program has the possibility of becoming a full-fledged welding program with a little more time, support and additional shop space. The Welding classes now being taught at St Helens have proven popular and are one of the few PCC classes taught in Columbia County that have steady enrollment.

It would be good to get the Newberg program started as well. The work has been done. The facilities are in place. Beginning classes in the Newberg facility will fill a need in the community. Given support, Newberg should enjoy the same success and potential as St. Helens.

Seven years ago the Portland Community College Welding program partnered with Vigor Marine at the Swan Island Shipyards and started a welding training center inside the yards. This training center has proven very popular with the business at the Shipyards, the Boilermakers Union and PCC students located on the East side of Portland wanting PCC welding classes. Currently PCC Welding has two shifts running at this site. One in the afternoon (12 to 5 pm) and one in the evening (5–10 pm). Blueprint Reading (Wld 102), Structural Steel Welding Codes (Wld 203) and Welding Process and Applications (Wld 101) are also offered at this site on alternate terms. The Swan Island Shipyard site could also support another full time shift in the mornings from 7 am until noon.

Welding classes at Portland Community College's Rock Creek campus are not just for students wanting to become Welders. The Rock Creek Campus also teaches classes to many of the other CTE programs. Examples would be Auto Body, Aviation, Diesel, Think Big and the Mill Wright apprenticeship program at Swan Island. BCT is currently exploring the possibility of adding a Welding class to their program in order to give their students valuable experience needed in the construction field.

Looking to the future of the Welding programs at all of our campus sites, I see a need to tap into the local High Schools to fill our classes with the young talent needed by the metals industries. CTE programs lost favor at the High Schools with the advent of the computer and the Dot Com generation. It was easy for the Administrators of the High Schools to cut CTE programs to save money and make room for computer labs. This nearsighted thinking has cost the construction industry dearly and now there are literally thousands of blue-collar jobs nationwide that are going unfilled.

**Appendix # 1**

***CORE OUTCOMES MAPPING SAC WLD: Welding 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.

**Core Outcomes:**

- 1. Communication.
- 2. Community and Environmental Responsibility.
- 3. Critical Thinking and Problem Solving.
- 4. Cultural Awareness.
- 5. Professional Competence.
- 6. Self-Reflection.

Course #	Course Name	CO1	CO2	CO3	CO4	CO5	CO6
WLD 100	Career Expectations	3	1	3	2	3	1
WLD 101	Weld Principles & Applications	3	1	3	2	3	1
WLD 102	Blue Print Reading for Welders	3	1	3	2	3	1
WLD 111	SMAW (E7024) & Oxyacetylene	2	1	3	2	3	1
WLD 112	SMAW Mild Steel I (E7018)	2	1	3	2	3	1
WLD 113	SMAW Mild Steel II (E7018)	2	1	3	2	3	1
WLD 114	SMAW: Mild Steel III (E6011)	2	1	3	2	3	1
WLD 115	SMAW: Mild Steel IV (E6011)	2	1	3	2	3	1
WLD 221	GTAW Mild Steel	2	1	3	2	3	1
WLD 131	Gas Metal Arc Welding	2	1	3	2	3	1
WLD 132	GMAW-Pulse and Spray Transfer	2	1	3	2	3	1
WLD 141	Flux Core Arc Welding I (Gas Shielded)	2	1	3	2	3	1
WLD 142	Flux Core Arc Welding II (Self Shielded)	2	1	3	2	3	1
WLD 151	SMAW Cert. Prac. Unlim thk Mild Steel	2	1	3	2	4	1
WLD 152	Wire Weld Certification PVAC	2	1	3	2	4	1
WLD 201	Welding Metallurgy <i>inactive</i>	2	1	3	2	3	1
WLD 202	Welding Inspection & Quality Control <i>inactive</i>	2	1	3	2	4	1
WLD 203	Structural Steel Welding Codes	3	1	3	2	4	1
WLD 204	NDT 1 <i>inactive</i>	2	1	4	2	4	1
WLD 205	NDT II <i>inactive</i>	3	1	3	2	3	1
WLD 206	Welding High Performance Skill <i>inactive</i>	2	1	3	2	3	1
WLD 263	Capstone	4	3	3	2	4	1
WLD 216	Misc. Electrodes & advanced positions	2	1	3	2	3	1
WLD 217	Diesel Welding	2	1	3	2	3	1
WLD 222	GTAW Aluminum	2	1	3	2	3	1
WLD 223	GTAW Stainless Steel	2	1	3	2	3	1
WLD 224	GTAW Pipe I	2	1	3	2	3	1
WLD 225	GTAW Pipe II	2	1	3	2	3	1
WLD 253	SMAW Cert. Practice 3/8 M.S. (E6011)	2	1	3	2	4	1

WLD 254 SMAW Cert. Practice 3/8 M.S. (E7018)	2	1	3	2	4	1
WLD 256 Prep for Pipe Cert. I	2	1	3	2	3	1
WLD 257 Prep for Pipe Cert. II	2	1	3	2	4	1
WLD 261 Basic Fabrication I	3	1	3	2	3	1
WLD 262 Basic Fabrication II	3	1	4	2	3	1
WLD 271 Oxy-acetylene welding projects	2	1	3	2	3	1
WLD 280 ACo-op Ed Welding	2	1	2	1	2	3
WLD 280 BCE Seminar	2	1	2	2	3	3
WLD 295 Sculpture Welding	2	1	3	2	3	3
WLD 9901 Welding Practice	2	1	2	2	3	1
WLD 9902 Welding Practice	2	1	2	2	3	1
WLD 9903 Welding Practice	2	1	2	2	3	1
WLD 9904 Welding Practice inactive	2	1	2	2	3	1
WLD 9905 Welding Practice inactive	2	1	2	2	3	1
WLD 9910 SMAW (Stick) course change 116a	2	1	2	2	3	1
WLD 9911 SMAW (Stick) course change 116b	2	1	2	2	3	1
WLD 9912 SMAW (Stick) course change 216a	2	1	2	2	3	1
WLD 9913 SMAW (Stick) course change 216b	2	1	2	2	3	1
WLD 9920 GTAW (TIG) course change 126a	2	1	2	2	3	1
WLD 9921 GTAW (TIG) course change 126b	2	1	2	2	3	1
WLD 9922 GTAW (TIG) course change 226a	2	1	2	2	3	1
WLD 9923 GTAW (TIG) course change 226b	2	1	2	2	3	1
WLD 9930 Wire Welding Practice course change 136a	2	1	2	2	3	1
WLD 9931 Wire Welding Practice course change 136b	2	1	2	2	3	1
WLD 9932 Wire Welding Practice course change 236a	2	1	2	2	3	1
WLD 9933 Wire Welding Practice course change 236b	2	1	2	2	3	1
WLD 156a Beginning OAC welding	2	1	2	2	3	1
WLD 156b Basic OAC welding	2	1	2	2	3	1
WLD 256a Int. OAC welding	2	1	2	2	3	1
WLD 256b Adv. OAC welding	2	1	2	2	3	1
WLD 166a Beginning practice Metal Sculpting	2	1	2	2	3	1
WLD 166a Basic practice Metal Sculpting	2	1	2	1	2	1
WLD 266a Int. practice Metal Sculpting	2	1	2	2	3	1
WLD 266b Adv. practice Metal Sculpting	2	1	2	2	3	1
WLD 186a Beginning Cert. Practice	2	1	2	2	3	1
WLD 186b Basic Cert. practice	2	1	2	2	3	1
WLD 286a Int. Cert. practice	2	1	2	2	3	1
WLD 286b Adv. Cert practice	2	1	2	2	3	1
WLD 176a Beginning Fab practice	2	1	2	2	3	1
WLD 176b Basic Fab practice	2	1	2	2	3	1
WLD 276a Int. Fab practice	2	1	2	2	3	1
WLD 276b Adv. Fab practice	2	1	2	2	3	1
WLD 146a Beginning Pipe practice	2	1	2	2	3	1
WLD 146b Basic Pipe practice	2	1	2	2	3	1
WLD 246a Int. Pipe practice	2	1	2	2	3	1
WLD 246b Adv. Pipe practice	2	1	2	2	3	1

**Appendix #2**  
**Employers employing current and past students**

- 1) Oregon Iron Works
- 2) Columbia Industries
- 3) Madden Industrial Craftsmen
- 4) Gunderson
- 5) Vigor Marine
- 6) Portland Kettle Works
- 7) Greenberry
- 8) Thompson Metal Fab
- 9) Fought
- 10) Vigor Industrial
- 11) Vigor Fab
- 12) Evraz Steel Mill
- 13) Evans Products
- 14) Beall Trailers
- 15) H.W. Welding
- 16) Rose City Fabrication
- 17) 24/7
- 18) Freightliner
- 19) AGC Heat Transfer

**Wages range from \$13-\$16 entry level to \$22-\$35 for journeyman**

**Appendix # 3****NUMBER OF STUDENTS COMPLETING  
DEGREE/CERTIFICATES**

<b>CALENDAR YEAR</b>	<b>DEGREE/CERT</b>	<b>AWARDED</b>
2010	AAS	9
2010	2 YEAR CERT	2
2010	1 YEAR CERT	0
2011	AAS	7
2011	2 YEAR CERT	5
2011	1 YEAR CERT	1
2012	AAS	16
2012	2 YEAR CERT	1
2012	1 YEAR CERT	2
2013	AAS	11
2013	2 YEAR CERT	1
2013	1 YEAR CERT	8
2014	AAS	17
2014	2 YEAR CERT	0
2014	1 YEAR CERT	61