2019-20

Instructional Program Review

Welding

Matthew Walter – Program Lead

CONTENTS

1. PROGRAM/DISCIPLINE MISSION/GOALS AND LINK TO STRATEGIC PLAN

1A. DESCRIBE PROGRESS TOWARD GOALS SET IN PREVIOUS REVIEW, ANNUAL BUDGET PRESENTATIONS, AND/OR STRATEGIC BUDGET PLANNING.

Goals of the Welding program include:

Goal 1. Community; Improve student employability and success by networking with local and regional employers.

This goal is and will be ongoing as employment opportunities change in the Klamath Basin and Oregon. The welding department has reached out to local employers such as Jeld-Wen, Collins, Diversified Contractors Incorporated, Pembina Pipeline, and various small employers in Klamath. Mediford is another important area we have worked to place students with employers such as Medford Fabrication, Highway Products, and Alumaweld Boats.

Currently working on new flyers and advertising for the welding program.

Goal 2. Access; Increase student enrollment by expanding career pathway opportunities for all students including high school students.

Increase student enrollment by expanding career pathway opportunities for all students including high school students. Career pathways allow a student to obtain a desired skill set in a shorter time. We are expanding dual credit opportunities to regional high schools so that high school students will have most or all the classes needed for a career pathway earned at the High school they attend.

The welding program also offers an afternoon welding class just for high school students.

Goal 3. Prosperity; Increase student access to multiple American Welding Society (AWS) certifications; increase our tracking of student success.

Increase the number of machines and wires that students can qualify on to tie this to what is trending in industry. The program has added two more classes to allow the students more time to practice on specific skills and processes.

Goal 4. Prosperity; Improve student success and prosperity by developing and implementing course and degrees in industry and manufacturing process.

Expand the welding certificate program to also offer the AAS degree in welding. The Welding program has been working with AAMET and other CTE programs to develop joint courses so more courses can be offered to a broader group of similar disciplined students. This will expand offerings as well as reduce required resources to offer these classes.

Goal A. Prosperity; Improve employability measures of work in the field of study and income attainment.

Build a student's skill base in all aspects of the welding field. Emphasize completion of all classes. Develop internship opportunities.

Goal B. Sustainability and Planning.

Reduce the cost of the welding program to the students, lower class fees, and inform new students of career pathway opportunities allowing students to reach their goals in a shorter period. Closer monitoring and reuse of materials and requesting the donations of materials or resources to help reduce costs.

1B. HAVE YOU MET YOUR PREVIOUSLY SET GOALS? IF NOT, HOW DO YOU PLAN TO MEET THEM?

☐Yes

☒No

Somewhat is the actual answer. Most of these goals are ongoing.

Goal 1. The welding program will always be looking for opportunities in the community. Currently in discussions with an individual who is hoping to set up a facility to manufacture farm tillage equipment.

Goal 2. The welding program has increased its opportunities for high school students. Since last year, we have been partnering with high schools in Lake county. There are numerous high schools in the area and the KCC's welding program partnership with them tends to fluctuate with the current vocational instructors at the time. In the Fall of 2019, we had record enrolment in the welding program.

Goal 3. The welding program has added more mandatory class time for both the certificate program and the career pathways. This extra time allows the students to acquire more AWS welder qualifications.

Goal 4. The goal of an AAS degree is a work in progress; the main drawback being time and personnel resources.

Goal A. The development of internships relates back to working with community partners. Once again, time, resources and willing partners hampers this endeavor. The Weld program has recently purchased new fabrication equipment. This will give students the chance to work with some more advanced industrial equipment thus expanding their skill set.

Goal B. The welding program has able to bring in work where an outside source other than the welding program paid for the materials. Example of this was a large art project fabricated in the weld shop by students and instructors funded by KCC Foundation. This brings valuable experience to the students without added expense to the program.

For any goals to be met it takes time and resources. As the Welding department Lead, I teach a full load of classes and then some (usually have credit overages every year). As the lead I am responsible for ordering supplies and consumables. The welding program has a large use of consumables such as metal to practice on, welding electrodes, welding machine and torch parts, and shielding gases. I must repair and maintain all the equipment in the shop.

For the last three years, there has been large time demand dealing with the ongoing construction at OIT. The welding shop square footage has been reduced by more than 20%. Most of the equipment in the shop has been moved numerous times along with redesign of the floor plan each time to accommodate these moves. As an example, currently due to Covid-19 issues all OIT labs are shut down and only Faculty and employees are allowed in. A new directive of the OIT construction is that the center courtyard of Cornett Hall is being totally striped of buildings and storage so benches and garden areas can be built in their place. This courtyard is the industrial access for supplies and materials, it has historically been storage for supplies. By June, we must remove all our metal storage racks, high pressure gas storage and worktables. New racks and storage areas must be designed and built to move all these materials into the weld shop space. This a huge task that has fallen onto the shoulders of the Welding Department lead.

2. PROGRAM/DISCIPLINE DESCRIPTION AND OVERVIEW

2A. PROVIDE THE CATALOG DESCRIPTION OF THE PROGRAM.

ONE-YEAR CERTIFICATE OF COMPLETION

Klamath Community College's Welding Technology Program offers a one-year certificate of completion as well as single classes. Emphasis areas include shielded metal arc welding (SMAW), gas tungsten arc welding (GTAW), gas metal arc welding (GMAW), flux-cored arc welding (FCAW), oxy-acetylene welding and cutting (OAW), and basic fabrication.

In order to complete the one-year program, students must satisfactorily complete welding and welding laboratory classes, general education classes, and cooperative work experience (on-the-job training).

The Welding Technology Certificate includes blueprint reading, welding processes and applications, welding metallurgy, shielded metal arc welding, gas metal arc welding, basic fabrication, and SMAW certification practice.

Program Learning Outcomes

Upon successful completion of the certificate, students will be able to:

- Use accepted industrial welding safety standards in the shop and in the field.
- Use a variety of welding processes (SMAW, GMAW, FCAW, oxy fuel, plasma cutting, GTAW) in the shop and in the field.
- Interpret welding blueprints in order to fabricate shop projects.
- Determine which welding process, settings, and materials to use depending on the application.
- Develop a welding procedure for specific applications.
- Apply fundamentals of metallurgy to identify metals and to perform heat treatment.

Program Requirements

Number of credit hours necessary for completion: **54**

LESS-THAN-ONE-YEAR CERTIFICATE OF COMPLETION

This career pathway certificate is designed to recognize students' accomplishments in welding and prepare them for entry-level work experiences in the welding industry. Students will be prepared with mathematics skills and the understanding of skills necessary to be valuable employees in the industrial welding trades. Credit from this certificate will transfer to the one-year welding certificate.

Program Learning Outcomes

Upon successful completion of the certificate, students will be able to:

- Use accepted industrial welding safety standards in the shop and in the field.
- Use a variety of welding processes (SMAW, GMAW, FCAW, oxy fuel, plasma cutting, GTAW) in the shop and in the field.
- Interpret welding blueprints in order to fabricate shop projects.
- Determine which welding process, settings, and materials to use depending on the application.
- Develop a welding procedure for specific applications.
- Apply fundamentals of metallurgy to identify metals and to perform heat treatment.

GAS METAL ARC/WIRE FEED WELDING CAREER PATHWAY CERTIFICATE

Less-Than-One-Year Certificate of Completion

This career pathway certificate is designed to recognize students' accomplishments in welding and prepare them for entry-level work experiences in the welding industry. Students will be prepared with mathematics skills and the understanding of skills necessary to be valuable employees in the industrial welding trades. Credit from this certificate will transfer to the one-year welding certificate.

Program Requirements

Number of credit hours necessary for completion: **14**

SHIELD METAL ARC/STICK WELDING CAREER PATHWAY CERTIFICATE

Less-Than-One-Year Certificate of Completion

This career pathway certificate is designed to recognize students' accomplishments in welding and prepare them for entry-level work experiences in the welding industry. Students will be prepared with mathematics skills and the understanding of skills necessary to be valuable employees in the industrial welding trades. Credit from this certificate will transfer to the one-year welding certificate.

Program Requirements

Number of credit hours necessary for completion: **12**

TIG/ALUMINUM STAINLESS STEEL FLAT WELDING CAREER PATHWAY CERTIFICATE

Less-Than-One-Year Certificate of Completion

This career pathway certificate is designed to recognize students' accomplishments in welding and prepare them for entry-level work experiences in the welding industry. Students will be prepared with mathematics skills and the understanding of skills necessary to be valuable employees in the industrial welding trades. Credit from this certificate will transfer to the one-year welding certificate.

Program Requirements

Number of credit hours necessary for completion: **14**

2B. DESCRIBE HOW AND TO WHAT DEGREE THE PROGRAM DESCRIPTION REFLECTS THE PROGRAM'S OVERALL GOALS. IF IT DOES NOT, REVISE PROGRAM DESCRIPTION.

The program description accurately reflects the Welding Program overall goals.

2C. COMMUNITY LABOR MARKET NEED ANALYSIS AND PROJECTION

. https://www.qualityinfo.org/jc-oprof/?at=1&t1=welding~514121~4117000008~1~true~false~true~true~false~true~false~true~true~true~false~false~true~none~0~1~1

OCCUPATION PROFILES REPORT

WELDERS, CUTTERS, SOLDERERS, AND BRAZERS (514121)

EAST CASCADES (CROOK, DESCHUTES, GILLIAM, HOOD RIVER, JEFFERSON, KLAMATH, LAKE, SHERMAN, WASCO, WHEELER)

Description

Use hand-welding, flame-cutting, hand soldering, or brazing equipment to weld or join metal components or to fill holes, indentations, or seams of fabricated metal products.

Projections					
Area	2017 Employment	2027 Employment	Annual Change Openings	Annual Replacement Openings	Total Annual Openings
Oregon	4,166	4,617	45	460	505
East Cascades	231	294	6	27	33

Data Sources and Limitations

Wage Range 2019			
Area	**Median Hourly**	**Avg Annual**	**Middle Range**
Oregon	$21.79	$46,529	$17.93 - $25.89
East Cascades	$22.83	$46,378	$17.52 - $26.68

Data Sources and Limitations

Current Job Openings There are 2 current job listings for this occupation.			
Job Title	**Location**	**Order Number**	**Wage Offered**
MIG Welder in Redmond	Bend	2569881	$16.50/hr to $18.00/hr
Aerospace TIG Welder	Redmond	2277795	

Industries of Employment
Industry breakouts are not available for this occupation.
Occupations with Similar Skills
No occupations with similar skills data is available for this occupation.

Statewide Employment Analysis
Employment in this occupation in 2017 was somewhat larger than most occupations across the state. The total number of job openings is projected to be somewhat larger than most occupations in Oregon through 2027. This occupation is expected to grow at a somewhat slower rate than the statewide average growth rate for all occupations through 2027.

Reasonable employment opportunities exist.

Area Employment Analysis
Employment in this occupation in 2017 was somewhat larger than most occupations in the region. The total number of job openings is projected to be somewhat larger than most occupations in the region through 2027. This occupation is expected to grow at a somewhat faster rate than the regional average growth rate for all occupations through 2027.

Educational Requirements
The typical entry level education for this occupation is a high school diploma or equivalent. Those with a postsecondary training (non-degree) have a competitive advantage in the labor market.

Prospective Jobs

Production worker	Welder	Fabricator
Production supervisor	Shop foreman	

2C.I. HAS THE DEMAND FOR GRADUATES CHANGED IN THE PAST FIVE YEARS? IF SO HOW AND TO WHAT DEGREE?

☐Yes
☒No

2C.II. WHAT IS THE EXPECTED MARKET DEMAND FOR THE FUTURE? HOW MIGHT THE LABOR MARKET NEED PROJECTION AFFECT THE PROGRAM? HOW MIGHT THE PROGRAM ADJUST TO THESE PROJECTIONS?

There is always demand for skilled labor in the marketplace, but demand is always based on the economy. Some welding jobs are less effect by changes in the economy such as government jobs. The regional economy and projects can affect the weld program. If there is an influx of large construction jobs such as pipelines or industrial facility erecting, this would demand welding skills in processes such as flux-core for thick steel. If more manufacturing jobs move into the area there might be higher demand for GTAW welding preforming welds on stainless steel. The weld program can rapidly adjust to market demands within its existing framework. In the existing classes, we can focus more on a type of material such as aluminum or a type of wire electrode currently being used in a particular field.

2D. DESCRIBE THE SPECIFIC CURRICULAR, INSTRUCTIONAL, OR OTHER CHANGES MADE IN THE PREVIOUS FIVE YEARS.

The mandate of all classes to use the Canvas platform for delivering instructional information has had the program use more internet content and resources. In welding skills, the program started getting more requests for welding qualifications in FCAW wires commonly used in field work and heavy fabrication. The program adapted by putting more emphasis on Flux-Cored wires and less on solid wires. This is reflected in changing the title description of one of the class (WLD 131) to include the term FCAW in the title.

We have added an afternoon class specifically for high school student, this is our WLD 101 introductory course in welding. We have been working on expanding this offering to make it a career pathway. This class is open to all high school student in Klamath County.

3. RESOURCES

3A. DESCRIBE FACULTY COMPOSITION, QUALIFICATIONS, AND PROFESSIONAL DEVELOPMENT.

At this time the Welding department faculty consists of one Nine Month employee who is also the department Lead, Matthew Walter. There are two temporary teaching assistants that are recent graduates of the welding program.

In Fall 2019, one adjunct, Tammy Chandler, that taught evening classes and assisted in other classes, quit for a full-time job because there was not enough guaranteed work at KCC. The other welding adjunct, Rick Howland, with 20 years of experience teaching at KCC, tragically died suddenly before the end of the term. His classes where taken over by the weld department Lead.

3A.I. WHAT PERCENT OF FACULTY ARE FULL-TIME? PART-TIME?

At this time there is only one welding 9-month faculty who is also the department lead, Matthew Walter. He has been at the position for more than five years.

The program adjunct that died, Rick Howland, taught two classes in the welding program, one each term, Blueprint Reading and Advance TIG. These will show up on CMA records of faculty teaching. What does not show up in CMA records are all the hours that the two adjuncts worked as teaching assistants. Welding classes are composed mostly of lab time. To accommodate a large number of students, (especially when classes are combined with both OIT and KCC students) assistants are needed. This was typically a minimum of 6 hours of class time a week.

FIRST NAME	*LAST NAME*	*EMAIL ADDRESS*
Mathew	*Walter*	walter@klamathcc.edu

3A.II. DESCRIBE FACULTY DEGREE ATTAINMENT. WHAT ARE THE MINIMUM DEGREE QUALIFICATIONS? WHAT PERCENT OF FACULTY EXCEED MINIMUM DEGREE QUALIFICATIONS?

The department lead has an AA degree in welding, certificate in supervision, a limited teaching credential in Welding through the University of California, Berkeley, and a Certified Welding Inspectors license through the American Welding Society. Also, Matthew Walter has 45 years of experience in the welding field, having worked for the University of California Lawrence Livermore National Labs for almost 30 years as Metal fabricator, shop foreman, and inspector. The department lead also has 30 years of experience teaching welding both as an adjunct and full time.

The late adjunct, Rick Howland, had 50 years of experience in the field having learned welding in the Navy, he earned a degree from OIT, he was a business owner and a KCC employee for 20 years.

Welding training takes both technical knowledge and hands-on skills. Faculty should have a minimum of 2 years technical school training and (6 years) on the job experience. They need to be proficient in numerous welding techniques and demonstrate proficiencies by industry recognized welder qualification tests. Faculty also need to have the proper people skills which not all trades people have. Having education or supervisory background is a big plus.

ID	Instructor Name	Taught DC	Taught RG	Sub Group	Orginal Hire Date	School	Degree	Major
509715	Walter, Mathew	N	Y	F9MO	4/15/2011	College of San Mateo	Associates	Welding

3A.III. LIST THE SPECIFIC PROFESSIONAL DEVELOPMENT PROGRAM FACULTY ATTENDED INCLUDING BOTH ON-SITE AND OFF-SITE TRAININGS; HOW DID THE PROFESSIONAL DEVELOPMENT IMPACT INSTRUCTION, DESIGN, AND DELIVERY?

The current lead has expanded professional development through on-site classes in computer technologies and Canvas. Since all classes use the Canvas format, training in this technology allows streamlined delivery of classes through the Canvas system. As a member of the American Welding Society, the department lead reads the monthly periodical “Welding Journal” published by AWS. He also occasionally participates in online welding forums. To maintain a Welding inspector License, Matthew Walter will need to take updated training and retest in 2020. The welding faculty will attend the FAB Tech welding trade show and conference which will be held in Las Vegas this year 2020 (if not cancelled due to Covid-19). This is annual show which is very important to attend to learn what the latest trends are in the welding field.

3A.IV. ARE FACULTY COMPOSITION, QUALIFICATIONS, AND PROFESSIONAL DEVELOPMENT MEETING INSTRUCTIONAL NEEDS? IF NOT, DESCRIBE ANY PLANS THAT WILL ADDRESS THIS.

☐Yes

☒No

☐Somewhat

KCC Welding program needs to bring on more adjuncts to teach and assist in classes. A couple of candidates have been reviewed but since the Covid-19 issue that has been put on hold. There are not enough classes or students to hire another full-time person. Qualified adjuncts need to be either retired or have a flexible schedule, so work and classes don’t conflict. A candidate needs to have the required background and skills but also the ability/personality to work with students in a shop environment one on one.

Of course, finding qualified and compatible employees takes considerable time and manpower. This also falls mostly on the department lead.

3B. DESCRIBE THE SPECIFIC FACILITIES, EQUIPMENT, AND MATERIALS USED BY THE PROGRAM.

KCC's welding program is housed at Oregon Institute of Technology, Cornett Hall. The facility is owned by OIT and KCC manages the welding shop. The equipment is a mix of ownership: some belonging to OIT and most of the modern equipment belonging to KCC.

Facilities and equipment are critical to any welding program. Welding has high electrical demands and it is vital the facility can meet that demand. Proper forced ventilation is critical to a safe work environment for the students. The space layout and materials used in the facility are important to the safety of the students.

3B.I. ARE FACILITIES MEETING INSTRUCTIONAL NEEDS? IF NOT, DESCRIBE ANY PLANS THAT WILL ADDRESS THIS.

☐Yes

☐No

☐Somewhat

This section needs some explanation of past, current and future issues when describing facilities. From the day I took on the Lead position in fall of 2015, the discussion of bringing the welding program on to KCC's campus was brought up. In the pursuing years, considerable man hours were use in exploring various options of establishing the welding program on to KCC's campus. From taking over or adding to various existing buildings on campus to building a completely new facility. Future plans are in the works to build a new facility that will house the welding program as well as other vocational trades. This will be a large advantage for KCC students since they will not have the expense of time and money to travel between OIT and KCC campuses. KCC classes and services will be more readily available to both students and faculty if the weld program was located at KCC. A concerning issue with relocating the welding program to KCC is the loss of revenue from OIT students that take KCC classes. It is unknown whether OIT students will travel to KCC or will OIT maintain some smaller weld program. OIT might eliminate the requirement all together

Previously, around 2000 (I believe), KCC and OIT went into agreement to allow KCC to operate the community College welding program out of OIT's facilities in return for teaching OIT's engineering students. This has been a symbiotic relationship that has worked well. The disadvantage of this situation for KCC students and instructors is the difficulty in utilizing resources offered at the KCC campus. The OIT facility was built in the 60's with parts of the facility having been updated in the last couple of years. The facility has size, approximately 6000 ft^2, even having been reduced by more than 20% in the recent renovation. The supply power is adequate, but some reduction occurred during the renovation. Ventilation is inadequate in today's standards which are more rigorous then would have been required in the 60's when originally constructed.

Presently the facility is adequate and usable, the ventilation and layout could be vastly improved, but would take a large input of money. As the lead, the idea of a brand-new facility is exciting but having dealt with the huge amount of work that was required by welding faculty and students hundreds of man

hours involved in the renovation at OIT is concerning. Dealing with the design, consulting, setup and moving will be a large job for welding staff.

3B.II. IS EQUIPMENT MEETING INSTRUCTIONAL NEEDS? IF NOT, DESCRIBE ANY PLANS THAT WILL ADDRESS THIS.

☐Yes

☐No

☒Somewhat

KCC has been replacing welding equipment periodically as money is available. New equipment is replacing decades old OIT welding equipment. Updating to more current and multifunction welding machines has allowed the welding program to expand learning opportunities for the students. Most of the shears and large forming equipment are owned by OIT although adequate and do the job they are very old. Manuals and parts are not even available. This leaves the program vulnerable to major break downs and most likely equipment that cannot be fixed. OIT has an in-house technician that maintains equipment the best he can with limited resources and time. A lot of the equipment maintenance and repair becomes the burden of the program lead.

If the program moves to a KCC facility, ownership of equipment and replacement of equipment owned by OIT that is left behind will need to be addressed.

3B.III. ARE INSTRUCTIONAL MATERIALS MEETING PROGRAM NEEDS? IF NOT, DESCRIBE ANY PLANS THAT WILL ADDRESS THIS.

☐Yes

☐No

☒Somewhat

One would assume that instructional materials would also refer to consumables, on which a welding program depends. It is the responsibility of the welding program lead to make sure the consumables required are stocked and maintained. Consumables consist of: steel and aluminum for welding practice; filler wires of various types and sizes; consumable parts for welding machines such as tips, cups and leads; shielding gas is a large consumable used daily. Consumable prices can be very volatile, so it is a continuous challenge for the welding department lead to maintain a supply of consumables while staying in the budget.

Instructional materials such as books and media material meet the program's needs. The main textbook is utilized for almost all the welding classes. Whenever possible, free material such as those distributed by manufacturers are utilized in the classroom.

3C. DESCRIBE THE INSTRUCTIONAL SUPPORT SERVICES THE PROGRAM USES.

As a point of reference, due to the location of the Welding program at OIT, most of the instructional support is related to non-welding classes. Classroom technology at OIT is subpar as compared to KCC. This is also true for OIT's IT department.

3C.I. REVIEW LRC HOLDINGS FOR RELEVANCY AND CURRENCY TO PROGRAM.

KCC Welding Program Review – Library Support

Consortium:

As a member of the Sage Library System, the KCC library provides students and faculty access to the holdings more than 70 libraries in 15 counties of eastern and central Oregon. The library is also a member of the Orbis Cascade Alliance courier system, which provides students access to the holdings of more than 35 academic libraries in Oregon and Washington.

Electronic Resources:

Databases

1. Academic Search Premier – full text academic journal, trade publication, and periodical articles on welding related topics
2. Business Source Premier – full text magazine, trade publication and academic journal articles
3. MAS Ultra School Edition – magazine and periodical articles about welding related topics
4. Masterfile Premier – full text academic journal and periodical articles about welding related subjects
5. Regional Business News – full text periodical articles – welding related subjects
6. Vocational and Career Collection – full text trade and industry periodical articles including many on welding and related subjects
7. Associates Programs Source – full text trade publications, magazines, and academic journals for two-year colleges – many welding related articles
8. Films on Demand – more than 300 videos about welding related subjects such as welding fumes, safety, tools, basic welding processes, advanced welding techniques, weld types, laying a bead and many more
9. Academic OneFile: full-text and peer reviewed academic journal articles and magazine articles about welding related subjects
10. OneFile: Business – full-text peer reviewed academic journal articles, full-text magazine articles and news reports with welding related subjects such as the robotic welding market, women in construction: welding, and more
11. OneFile: Science – magazine and full text academic journal articles

eBooks

1. Welding: Processes, Quality, and Applications – Richard J. Klein
2. Welding Handbook – American Welding Society
3. Advanced Welding and Micro Joining/Packaging for the 21st Century – Changhee Lee
4. Friction Stir Welding and Processing – Murray W. Mahoney
5. Joining: Understanding the Basics – F.C. Campbell
6. Corrosion of Weldments – J.R. Davis
7. Advanced Automation Techniques in Adaptive Material Processing – Aik Meng Fong
8. Pipe Welding Procedures

Physical Holdings: Books and DVDs

1. Welding: Principles and Applications – Larry F. Jeffus
2. Welding Handbook
3. Welding Handbook: Arc and Gas Welding and Cutting, Brazing and Soldering – American Welding Society
4. Welding Handbook: Resistance and Solid-State Welding and Other Joining Process – American Welding Society
5. Welding Handbook: Metals and Their Weldability

6. Welding Handbook: Engineering, Costs, Quality and Safety – American Welding Society
7. Blueprint Reading for Welders – A.E. Bennett

3C.II. REVIEW PROGRAM STUDENT USE OF TUTORING AND E-TUTORING.

Welding students will use tutoring services in their general study classes. Any tutoring required by students in welding core classes has been done by either weld faculty or advanced welding students.

3C.III. REVIEW PROGRAM STUDENT USE OF TESTING SERVICES.

Welding students use the testing center for their general study classes such as Math. Due to the distance of the welding program in relation to the KCC campus, test services are generally not used in the welding program.

LRC Testing Center Supports
2016 to (5/7/20)

Testing Center Exams:

Welding

2016	9
2017	3
2018	0
2019	7
2020	7

3C.IV. REVIEW OTHER INSTRUCTIONAL SUPPORT SERVICES (STUDENT CLUBS, ADVISING, TRIO, VETERANS SERVICES, ETC.) IF APPLICABLE.

Due to the distance of KCC's services from where classes are taught, welding students use less of the services, but they are still available to them.

LRC Tutoring Center Supports
Summer 2018 through Winter 2020

Tutoring Center Users:

Accounting/Business/Computers:	828
Math/Nursing/Science:	6268
Literature/Speech/Writing:	1005
Other:	553

3D. DESCRIBE TO WHAT DEGREE THE PROGRAM USES THE COLLEGE'S LEARNING MANAGEMENT SYSTEM (CANVAS) FOR ALL METHODS OF DELIVERY (FACE-TO-FACE, ONLINE, SYNCHRONOUS, HYBRID).

The welding program uses the College's learning platform (Canvas) for all methods of delivery for every class offered. In face-to-face classes, Canvas is used to provide information for classroom instruction and study materials. Canvas is also used to provide information and discussions allowing the student to learn the material.

An issue of note is OIT's classroom technology for delivery of informational materials in the classroom is considerable lacking compared to what is available at KCC. This limit some of the presentation options of class material.

4. EFFECTIVENESS

4A. STUDENT LEARNING OUTCOMES ASSESSMENT

4A.I. COURSE LEARNING OUTCOMES (CLO)

There have not been any CLO assessments scheduled for Welding courses.

4A.I.1 DESCRIBE EVIDENCE OF STUDENT PROFICIENCY IN CLOS. IF THERE IS NO EVIDENCE, DESCRIBE PLANS TO ADDRESS THIS.

Students are constantly tested on welding theory and terminology through quizzes, tests, and written homework. Students' manipulative skills are tested by standard welder qualification tests outlined by the American Welding Society.

4A.I.2 DESCRIBE THE SPECIFIC PROCESS FOR ADVISORY COMMITTEES FOR REVIEWING COURSE CONTENT AND OUTCOMES GUIDES (CCOGS). IF THERE IS NO PROCESS, DESCRIBE PLANS TO ADDRESS THIS.

Unless there are planned changes, there is no process for reviewing CCOGS. If there are plans to change a portion of a course, this would be discussed with the welding staff and dean. Any planned changes would be brought to a meeting of the advisory committee.

4A.I.3 WHICH COURSES HAD LEARNING OUTCOMES REVISED/UPDATED AND WHY?

No courses have had major outcomes revised however expansion of some courses (career pathways) have allowed students more time to meet learning outcomes. See 4A.1.4

4A.I.4 IDENTIFY AND GIVE EXAMPLES OF CHANGES MADE IN INSTRUCTION THAT OCCURRED AS THE RESULT OF CLO ASSESSMENT. IF THIS HAS NOT OCCURRED, DESCRIBE PLANS TO ADDRESS THIS.

Changes have been made to instruction by expanding two classes and two career pathways requirements. Students were not having enough time to reach a level of proficiency needed in the industry. The addition of two classes, WLD 254 and 255, gives the students more time to perfect their skills in GTAW and GMAW. Both these classes are strictly lab classes.

4A.II PROGRAM LEARNING OUTCOMES (PLO)

4A.II.1 DESCRIBE EVIDENCE OF STUDENT PROFICIENCY IN PLOS. IF THERE IS NO EVIDENCE, DESCRIBE PLANS TO ADDRESS THIS.

A PLO was done in WLD 131 class Winter 2019 (4-14-2019). Vertical down test coupons on 14 gauge steel using GMAW .035 solid steel wire and 75/25 shield gas. Test preformed in accordance to AWS D1.3. This test was done in the first half of the term. About 70% were able to complete the test satisfactorily.

4A.II.2 IDENTIFY AND GIVE EXAMPLES OF CHANGES MADE IN INSTRUCTION THAT OCCURRED AS THE RESULT OF PLO ASSESSMENT. IF THIS HAS NOT OCCURRED, DESCRIBE PLANS TO ADDRESS THIS.

WLD 101.01 Fall 2017
Use accepted industrial welding safety standards in the shop and in the field.

Which artifacts were gathered that show evidence of student proficiency in the outcome?	Exam (Including final exam)
Enter the percentage of students who demonstrated proficiency of the outcome.	The achievement data was based on a test of safety issues and requirements related to the welding industry. This test is given on the first class day of the second week. All students passed with a 90% grade or better.
What contributed to student success and/or lack of success?	1
Compare your students' self-assessment of their outcome proficiency to your direct assessment results.	Student success can be attributed to attendance, in class work and homework assignment directly related to the safety test.
Did student achievement meet your expectations for successfully teaching to the outcome?	NULL
Based on your analysis, what course adjustments have you made or will you make?	Yes
What resources would be required to implement your recommended course adjustments (materials, training, technology, etc.)? What budget implications result?	More class student interaction to reinforce safety issues.
Were your assessment methods accurate indicators of student learning? Why or why not?	Supply the students with a copy of Z49.1:2012 SAFETY IN WELDING AND CUTTING AND ALLIED PROCESSES (AWS Z49.1). Cost is minimal relating to the cost of copy a free available PDF version of the document.

Reflect on any adjustments you made from the last assessment of this course and the effectiveness in student achievement of outcomes, if applicable.	My assessment method is accurate way for the students to demonstrate their knowledge of the subject matter

WLD 114.02 Fall 2017

Use a variety of welding processes (SMAW, GMAW, FCAW, oxy fuel, plasma cutting, GTAW) in the shop and in the field.

Which artifacts were gathered that show evidence of student proficiency in the outcome?	Performance Demonstration
Enter the percentage of students who demonstrated proficiency of the outcome.	The achievement data was collected during a live demonstration of the students ability to setup, properly operate and disassemble an oxyacetylene cutting station. The data gathered was students demonstration of proficiency based on a standard industrial a
What contributed to student success and/or lack of success?	100% of students passed with at least an 85% score
Compare your students' self-assessment of their outcome proficiency to your direct assessment results.	Student success can be attributed to the use of the oxyacetylene process through out the term
Did student achievement meet your expectations for successfully teaching to the outcome?	Each Student success rate should be at 100%, there is not a lot of room for error when their health and well being is at stake
Based on your analysis, what course adjustments have you made or will you make?	On my analysis I will introduce the process earlier in the course and emphasize the check list more frequently
What resources would be required to implement your recommended course adjustments (materials, training, technology, etc.)? What budget implications result?	Build a better more streamlined checklist. Obtain a short manual that emphasizes the need or reason for the different steps on the checklist. More scrap material needs to be obtained for the students to practice on. Budget expenditure or time expenditures
Were your assessment methods accurate indicators of student learning? Why or why not?	My assessment was a good way for the students to demonstrate their operational knowledge of the Oxyacetylene cutting process.
Reflect on any adjustments you made from the last assessment of this course and the effectiveness in student achievement of outcomes, if applicable.	Since the last assessment I have introduced the processes soon and plan to utilize it more often during the Term.

WLD 114.01 Fall 2018

Use a variety of welding processes (SMAW, GMAW, FCAW, oxy fuel, plasma cutting, GTAW) in the shop and in the field.

Which artifacts were gathered that show evidence of student proficiency in the outcome?	Performance Demonstration
Enter the percentage of students who demonstrated proficiency of the outcome.	The achievement data was collected during a live demonstration of the students ability to setup, properly operate and disassemble an oxyacetylene cutting station. The data gathered was students demonstration of proficiency based on a standard industrial a
What contributed to student success and/or lack of success?	100% of students passed with at least an 85% score
Compare your students' self-assessment of their outcome proficiency to your direct assessment results.	Student success can be attributed to the use of the oxyacetylene process through out the term
Did student achievement meet your expectations for successfully teaching to the outcome?	NULL
Based on your analysis, what course adjustments have you made or will you make?	Each Student success rate should be at 100%, there is not a lot of room for error when their health and well being is at stake
What resources would be required to implement your recommended course adjustments (materials, training, technology, etc.)? What budget implications result?	On my analysis I will introduce the process earlier in the course and emphasize the check list more frequently
Were your assessment methods accurate indicators of student learning? Why or why not?	Build a better more streamlined checklist. Obtain a short manual that emphasizes the need or reason for the different steps on the checklist. More scrap material needs to be obtained for the students to practice on. Budget expenditure or time expenditures

WLD 131.01 Winter 2019

Use a variety of welding processes (SMAW, GMAW, FCAW, oxy fuel, plasma cutting, GTAW) in the shop and in the field.

Which artifacts were gathered that show evidence of student proficiency in the outcome?	NULL

Enter the percentage of students who demonstrated proficiency of the outcome.	Vertical down test coupons on 14 gauge steel using GMAW .035 solid steel wire and 75/25 shield gas. Test preformed in accordance to AWS D1.3
What contributed to student success and/or lack of success?	70
Compare your students' self-assessment of their outcome proficiency to your direct assessment results.	Those students that better utilized their time and had regular attendance out performed students that had poor attendance
Did student achievement meet your expectations for successfully teaching to the outcome?	Some of the students per perception of the work quality did not meet the the standards needed to pass the requirements put forth in the AWS D1.3 code
Based on your analysis, what course adjustments have you made or will you make?	Yes
What resources would be required to implement your recommended course adjustments (materials, training, technology, etc.)? What budget implications result?	In the future I will have students that performed poorly on this task revisit it in the last week of term. There skill leave should improve during the term even if working on different tasks
Were your assessment methods accurate indicators of student learning? Why or why not?	Having a larger number of test coupons available to students would give them more time to focus on there welding. Although a small increase in expense we should be able to cover it in the existing budget.
Reflect on any adjustments you made from the last assessment of this course and the effectiveness in student achievement of outcomes, if applicable.	Yes, students that applied themselves were able to complete the task satisfactory.
Comments:	This course was assessed several years ago prior to our current PLO Assessment Planning and Reporting model. At that time, I updated all paperwork and implemented the student self evaluation to get more specific feedback from the student regarding their

4B. STUDENT SUCCESS

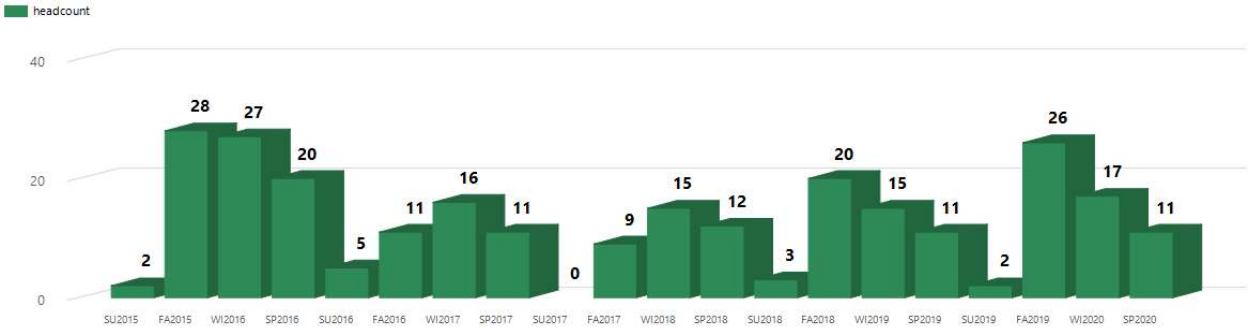
4B.I. DESCRIBE ENROLLMENT TRENDS AND PLANS TO ADDRESS THEM.

Student enrollment has fluctuated up and down over the years, 2019-2020 had a good increase in enrollment. Usually when the job market is poor, we have more students and fewer students when there are more job opportunities. I have noticed in 2019 that a number of students are currently working, but have come back to increase their skills in welding. Another increase of students has been from new requirements generated by other CTE programs (diesel and advance manufacturing) to include a welding class. The welding program has been promoting the welding program in the high schools for about the last five years and had a well-attended class for the 2019-2020 year. Unfortunately, we have not been able to offer the class to the high schools' consistently due

to a number of reasons. Part of the problems have been coordinating with the high schools over schedules since KCC runs on terms and local high schools run their schedule on semesters. Ongoing construction at OIT also caused the program not to offer the high School class for a year.

5 Year Headcount Comparison

Academic Year	Term Year	Headcount
⊞ AY 2015-16	Total	77
⊞ AY 2016-17	Total	43
⊞ AY 2017-18	Total	36
⊞ AY 2018-19	Total	49
⊞ AY 2019-20	Total	56
Total		**261**



4B.II. DESCRIBE DEGREE AWARDED TRENDS AND PLANS TO ADDRESS THEM.

The key with Spring 2020 degrees has been the Covid-19 issue which will also delay some other student degrees into the next school year. Another lag in degrees awarded has been the addition of two new classes required for a certificate or pathway. The weld program has been addressing this by allowing students to flex their schedule to take the two new advanced classes at a time that is a good fit. We have noticed a number of students already employed, but just taking a few classes to advance their skills. I don't believe the data is on the graph is correct.

4B.III. REVIEW TRANSFERABILITY OF PROGRAM.

Very few of the welding classes are transferable to higher education institutions. KCC's WLD 101, for example, is transferable to OIT to meet the requirements for MFG 103 for all engineering students.

4B.III.1 DESCRIBE TRANSFERABILITY FROM HIGH SCHOOL TO KCC TO OUS.

The welding program has been involved in promoting dual credit classes for high school students. This allows students from high schools to transfer into KCC's welding program with several credits toward either a career pathway or a certificate. Welding classes are not transferable to the OUS.

4B.III.2 HAS THIS CHANGED OVER THE LAST FIVE YEARS? IF SO, WHY? WHAT ARE THE IMPACTS ON STUDENTS AND THE PROGRAM?

Over the last five years, expanding dual credit offerings to the high schools as well as offering special welding classes just for high school students has increased enrollment. It opened welding to a new group of students that might not have thought of the career opportunities in the welding field.

4C. STUDENT ENGAGEMENT AND SATISFACTION

4C.I. COURSE EVALUATIONS DATA AND ANALYSIS

Please see the appendix, Section 8B.

4C.I.1 DESCRIBE CHANGES MADE IN INSTRUCTIONAL METHODS BASED ON STUDENT COURSE EVALUATION DATA. IF THIS HAS NOT OCCURRED, DESCRIBE PLANS TO ADDRESS THIS.

Changes in instructional methods based on student evaluations have mostly involved better explanation of what is expected of students for the day or week. Now, at the beginning of the week, either by a face to face meeting or/and Canvas, a detailed explanation of what is to be done and the expected outcome for the students in the lab during the week is presented.

4C.I.2 DESCRIBE CHANGES MADE TO THE COURSE BASED ON STUDENT COURSE EVALUATION DATA.

No major changes have been done to the course other than attempting to get more practice/lab time for students.

4C.II JOB PLACEMENT DATA AND ANALYSIS (IF AVAILABLE)

This is not formally available at this time. I believe if there was a system for this in the college it would be a very valuable tool in seeing market trends and post school student needs.

5. BUDGET

5A. PROVIDE FIVE-YEAR COST MARGIN DATA AND ANALYSIS.

Column1	AY Total 15-16	AY Total 16-17	AY Total 17-18
CREDIT_INST_LOAD	79.375	50.5	44
CE_INST_LOAD	0	0	0
OVERSIZE	0	0	0
Lecture Credits	5	22	15
Lab Credits	2.666666667	0	0
Combined For. Cr.	57.5	53	83.5
FacilityFee	$3,600.00	$2,250.00	$3,007.20
Tuition	$54,540.00	$34,987.50	$51,848.00
TechnologyFee	$2,400.00	$1,500.00	$2,864.00
CourseFee	$20,865.00	$13,885.00	$13,850.00
DistanceFee	$ -	$ -	$ -
StudentGovtFee	$ 1,500.00	$ 937.50	$ 895.00
TotalTuitionFees	$ 82,905.00	$ 53,560.00	$ 73,097.95
Reimbursable_FTE	26.378316	17.060707	21.439082
Headcount	261	164	182
ADJPay	$ 32,211.00	$ 8,966.63	$ 12,312.11
FTPay	$ 102,241.21	$ 85,294.29	$ 87,964.48
CEPay	$ -	$ -	$ -
TotalPay	$ 134,452.21	$ 94,260.92	$ 100,276.59
PayPerCreditLoad	1693.88613	1866.552827	2279.013366
Margin	$ (79,912.21)	$ (59,273.42)	$ (48,428.59)
	-147%	-169%	-93%

5B. SUMMARIZE PREVIOUS ANNUAL PROGRAM VIABILITY STUDY RESULTS AND EXPLAIN HOW CHANGES IMPACTED STUDENT LEARNING OUTCOME PROFICIENCY. IF THIS HAS NOT OCCURRED, DESCRIBE PLANS TO ADDRESS THIS.

Viability studies mostly result at Klamath Community College for programs with low enrollment. On the average this is not been an issue for welding. Current industry trends are looking as there will be a continued need for skilled trades personnel.

The program has combined multiple classes in one lab period thus helping its ongoing viability and conservation of resources.

5C. EXPLAIN ANY BUDGETARY CHALLENGES AND ANY PLANS TO ADDRESS THEM.

The welding program has daily budgetary challenges. The welding program revolves around the use of equipment and consumables. The department lead can estimate the required consumables for a term or possibly the year, but student numbers can greatly affect the volume used. The market for steel and gases has been very volatile in recent years especially with the political turmoil around trade tariffs. Klamath Basin's small industrial footprint is susceptible to issues related to local venders as well as the decline of the number of venders. Venders are usually willing to work with schools, but at the same time they are still controlled by market cost. This is a challenge for the Welding Department lead, one the lead attempts to address by purchasing consumables each term based on the number of students. The weld faculty must be constantly vigilant about monitoring students, so consumables are used in the most efficient manner. Whenever possible, the department will request donations from local companies.

Equipment is purchased mostly on a grant basis; however smaller items can be purchased in the regular budget. The budget challenge is equipment breakdown and repairs. OIT provides a facility technician that can-do minor repairs and maintenance. Several pieces of equipment that are vital to the program are older to the point repair parts are not available. An example of this is the shear, a 1950's Voste 8' by 1/8" cut capacity. Although we have been able to maintain and keep it running (it is starting to have problems), replacement cost would be in the range of 30 to 50,000 dollars. Another way the program has addressed this issue is if repairs are too expensive and the equipment is not 100% vital, we mothball the equipment and try to replace it with new equipment when grant opportunities arise.

6. CONCLUSION

6A. DESCRIBE PROGRAM STRENGTHS.

KCC's welding program has a large selection of top of the line welding equipment, as well as older model welders commonly used in industry. This selection of equipment allows the program to train students on all the most common welding process used to in the industry. With a large shop space (6000 sq. ft.) and a good selection of fabrication tools (both power and manual), advanced students have the opportunity to learn more than just welding. By learning the operation of metal fabrication tools such as power press brakes and rolls, students are given a great introduction into the metal fabrication world, opening up more employment opportunities in the trade.

By having a certified American Welding Society (AWS) Welding Inspector on staff, students can earn AWS recognized welder qualifications in all weld process offered at KCC. AWS certifications are required for most industry welding positions, by obtaining these at KCC, students become much more desirable to potential employers.

By having KCC's welding program located at OIT and tied to their engineering programs, the welding program has almost twenty guaranteed students in one introductory weld class every term. OIT students also have the opportunity to take advanced classes offered by KCC as electives. Since OIT draws students from all over the US, this gives the welding program a source of students from areas other than the local region.

6B. DESCRIBE PROGRAM WEAKNESSES.

As of Fall 2019, the welding program is very short on staff. The program can only support one full time instructor but there is a need for experienced personnel that can work part time. Not only has this placed a strain on the program, but it creates a weak link where there are no substitute instructors available.

The location of KCC's welding program at OIT has major economic advantages but creates some challenges for KCC students and instructors. Taking other classes or using KCC campus resources can be hard when one has to travel 20 minutes (45 minutes by bus) across town to get from one campus to another.

Klamath, being a small community with limited industry, means the weld program has had minimal success with strong industrial partners. This has more impact on students than the program due to limited opportunities for students to internship or work in the local area.

6C. DESCRIBE SUPPORT NEEDED.

As stated above more depth of qualified personnel.

Outreach and marketing support. (Formally we had an adjunct that was excellent at school events and job fairs.)

A liaison type to local and regional industry for welding and manufacturing. One that can make new contacts as well maintain old ones. Develop leads for student employment. Someone that can help with advisory committees.

The program constantly needs student help for inventory, minor maintenance, and student support.

As the welding lead and full-time instructor, I am responsible for the daily function of a 6000 sq. ft. weld shop which includes maintaining thousands of dollars of consumable inventory (metal, gases, electrodes, etc.) every term. The responsibilities also include maintaining more than 60 pieces of equipment in safe and operable condition. As a department lead, one is also responsible for advising welding students, curriculum development and issues, developing CLOs, PLOs and other assessment duties. The lead is also responsible for outreach, advisory committees and dual credit interface with the high schools. Other duties have been to interface directly with OIT and construction personnel (Adroit and their subcontractors) over the past three years of renovation of Cornett Hall. Due to the weld facility location, the majority of administrative duties have to be done remotely. As one can see the welding department lead has ample work and the above support is needed.

6D. CREATE NEW GOALS AND LINK THEM TO THE STRATEGIC PLAN.

Develop more advanced class offerings that would focus on specific skill sets related to welding and the metal trades. These classes would also lead towards an AAS degree in welding technology, Goal 4, Prosperity, giving students more marketable skills.

Develop more online material instead of the conventional face-to-face classroom format. Due to the new rules related to Covid-19, this will help meet social distancing guidelines while still delivering the information students need. Goal 2, Access, making course materials readily available while keep students and faculty safe.

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8. APPENDICES

OCCUPATION PROFILES – STATE OF OREGON EMPLOYMENT DEPARTMENT

Welders, Cutters, Solderers, and Brazers (514121)

East Cascades (Crook, Deschutes, Gilliam, Hood River, Jefferson, Klamath, Lake, Sherman, Wasco, Wheeler)

DESCRIPTION

Use hand-welding, flame-cutting, hand soldering, or brazing equipment to weld or join metal components or to fill holes, indentations, or seams of fabricated metal products.

JOB OPENINGS LISTED WITH THE OREGON EMPLOYMENT DEPARTMENT

for Welders, Cutters, Solderers, and Brazers

There are 2 current job listings for this occupation.

Job Title	Date Posted	Location	Wage Offered
MIG Welder in Redmond	04/07/2020	Bend	$16.50/hr to $18.00/hr
Aerospace TIG Welder	01/22/2019	Redmond	

Job Openings from other Websites

for Welders, Cutters, Solderers, and Brazers

The following job openings have been automatically extracted from various sites across the Web. These links are provided as supplemental resources. However, the Employment Department cannot validate these openings nor endorse any of these external sites. Some of these jobs may no longer be open. In some cases, a single opening may be posted on multiple sites.

There are 1 current job listings for this occupation.

Job Title	Date Posted	Location	Employer
Welder	03/25/2020	Arlington	Waste Management

State of Oregon Licenses & Certifications

for Welders, Cutters, Solderers, and Brazers

No statewide license is required for this occupation.

WAGE RANGE

for Welders, Cutters, Solderers, and Brazers

Area	10th Percentile	25th Percentile	50th Percentile (median)	75th Percentile	90th Percentile	Average Hourly	Average Annual
Oregon	$15.49	$17.93	$21.79	$25.89	$30.81	$22.37	$46,529
Area East Cascades	10th Percentile $14.23	25th Percentile $17.52	50th Percentile (median) $22.83	75th Percentile $26.68	90th Percentile $29.68	Average Hourly $22.30	Average Annual $46,378

Data Sources and Limitations

EMPLOYMENT OUTLOOK

for Welders, Cutters, Solderers, and Brazers

Statewide Employment Analysis	Employment in this occupation in 2017 was somewhat larger than most occupations across the state. The total number of job openings is projected to be somewhat larger than most occupations in Oregon through 2027. This occupation is expected to grow at a somewhat slower rate than the statewide average growth rate for all occupations through 2027. Reasonable employment opportunities exist.
Area Employment Analysis	Employment in this occupation in 2017 was somewhat larger than most occupations in the region. The total number of job openings is projected to be somewhat larger than most occupations in the region through 2027. This occupation is expected to grow at a somewhat faster rate than the regional average growth rate for all occupations through 2027.

Data Sources and Limitations

AREA EMPLOYMENT PROJECTIONS

for Welders, Cutters, Solderers, and Brazers

Area	2017 Employment	2027 Employment	% Change	Annual Change Openings	Annual Replacement Openings	Total Annual Openings
Oregon	4,166	4,617	10.8%	45	460	505
Area East Cascades	2017 Employment 231	2027 Employment 294	% Change 27.3%	Annual Change Openings 6	Annual Replacement Openings 27	Total Annual Openings 33

Replacement openings occur when workers permanently leave an occupation for reasons such as retirement.

Data Sources and Limitations

Industries of Employment

for Welders, Cutters, Solderers, and Brazers

Industry	Employment
Total All Industries	231
Fabricated Metal Product Manufacturing	53

Occupational employment in some industries may not be displayed due to confidentiality.

EDUCATIONAL REQUIREMENTS

for Welders, Cutters, Solderers, and Brazers

The typical entry level education for this occupation is a high school diploma or equivalent. Those with a postsecondary training (non-degree) have a competitive advantage in the labor market.

KNOWLEDGE

Examples of the knowledge needed for success in this occupation is listed below, in order of importance. This information comes from the Occupational Information Network (O*NET).

- **Production and Processing:** Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.
- **Design:** Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.
- **Administration and Management:** Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.

ABILITIES

Examples of the abilities needed for success in this occupation are listed below, in order of importance. This information comes from the Occupational Information Network (O*NET).

- **Arm-Hand Steadiness:** Keeping your arm or hand steady.
- **Near Vision:** Seeing details up close.

- **Multilimb Coordination:** Using your arms and/or legs together while sitting, standing, or lying down.
- **Problem Sensitivity:** Noticing when problems happen.
- **Control Precision:** Quickly changing the controls of a machine, car, truck or boat.

DETAILED WORK ACTIVITIES

Examples of the detailed work activities involved with this occupation are listed below, in order of importance. This information comes from the Occupational Information Network (O*NET).

- Braze metal parts or components.
- Align parts or workpieces to ensure proper assembly.
- Lay out parts to prepare for assembly.
- Measure dimensions of completed products or workpieces to verify conformance to specifications.
- Assemble metal or plastic parts or products.

Data Sources and Limitations for Knowledge, Skills, Abilities, Detailed Work Activities

SCHOOLS AND TRAINING PROVIDERS

for Welders, Cutters, Solderers, and Brazers

The training providers listed below offer programs related to this occupation. This information is updated once per year. Anyone interested in a particular program should check with the training institution regarding its availability. Listing these training providers does not necessarily constitute or imply their endorsement, recommendation, or favoring by the State of Oregon.

School	City	Programs of Training and 2016 Graduates		
Blue Mountain Community College	Pendleton	Welding Technology/Welder	Postsec. Awards/Cert./Diplomas <1 yr.	3
Chemeketa Community College	Salem	Welding Technology/Welder	Postsec. Awards/Cert./Diplomas 1-2 yrs.	8
		Welding Technology/Welder	Associate Degree	7
Clackamas Community College	Oregon City	Welding Technology/Welder	Postsec.Awards/Cert./Diplomas <1 yr.	5
		Welding Technology/Welder	Postsec. Awards/Cert./Diplomas 1-2 yrs.	4
		Welding Technology/Welder	Associate Degree	5
Clatsop Community College	Astoria	Welding Technology/Welder	Postsec. Awards/Cert./Diplomas <1 yr.	5
		Welding Technology/Welder	Postsec.Awards/Cert./Diplomas 1-2 yrs.	1
		Welding Technology/Welder	Associate Degree	1
Klamath Community College	Klamath Falls	Welding Technology/Welder	Postsec.Awards/Cert./Diplomas <1 yr.	43
		Welding Technology/Welder	Postsec.Awards/Cert./Diplomas 1-2 yrs.	4
Lane Community College	Eugene	Welding Technology/Welder	Postsec.Awards/Cert./Diplomas <1 yr.	27
		Welding Technology/Welder	Postsec.Awards/Cert./Diplomas 1-2 yrs.	17

		Welding Technology/Welder	Associate Degree	15
Linn-Benton Community College	Albany	Welding Technology/Welder	Postsec.Awards/Cert./Diplomas 1-2 yrs.	19
		Welding Technology/Welder	Associate Degree	18
Mt Hood Community College	Gresham	Welding Technology/Welder	Postsec.Awards/Cert./Diplomas <1 yr.	5
		Welding Technology/Welder	Postsec.Awards/Cert./Diplomas; 1-2 yrs.	24
		Welding Technology/Welder	Associate Degree	0
Portland Community College	Portland	Welding Technology/Welder	Postsec.Awards/Cert./Diplomas; <1 yr.	167
		Welding Technology/Welder	Associate Degree	13
Rogue Community College	Grants Pass	Welding Technology/Welder	Postsec.Awards/Cert./Diplomas; <1 yr.	15
		Welding Technology/Welder	Postsec.Awards/Cert./Diplomas; 1-2 yrs.	7
		Welding Technology/Welder	Associate Degree	2
Southwestern Oregon Community College	Coos Bay	Welding Technology/Welder	Postsec.Awards/Cert./Diplomas; <1 yr.	44
		Welding Technology/Welder	Postsec.Awards/Cert./Diplomas; 1-2 yrs.	17
		Welding Technology/Welder	Associate Degree	9
Treasure Valley Community College	Ontario	Welding Technology/Welder	Postsec.Awards/Cert./Diplomas; <1 yr.	42
		Welding Technology/Welder	Postsec.Awards/Cert./Diplomas; 1-2 yrs.	3
		Welding Technology/Welder	Associate Degree	12
Umpqua Community College	Roseburg	Welding Technology/Welder	Postsec.Awards/Cert./Diplomas; 1-2 yrs.	1

CAREER PATHWAYS

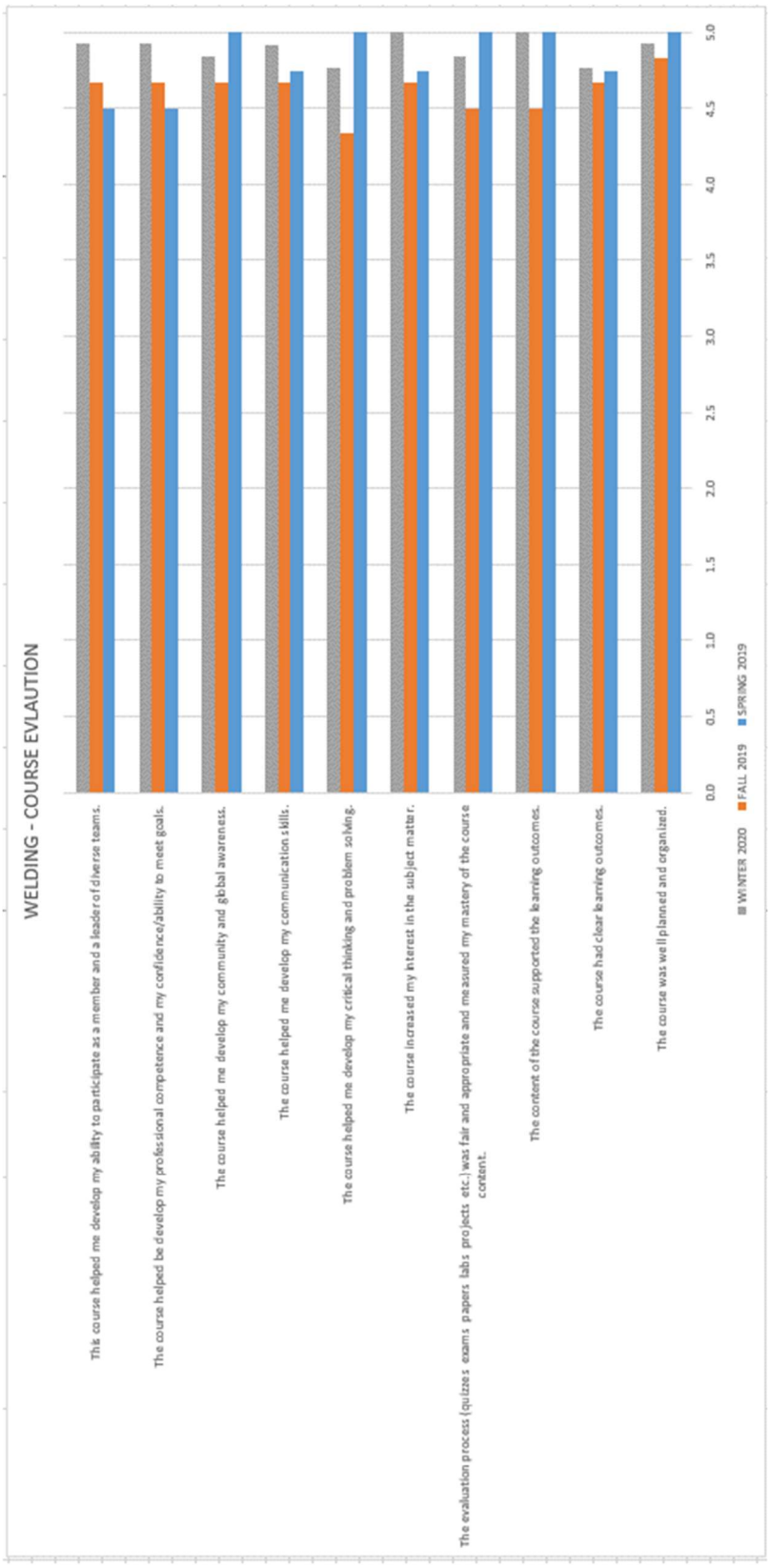
for Welders, Cutters, Solderers, and Brazers

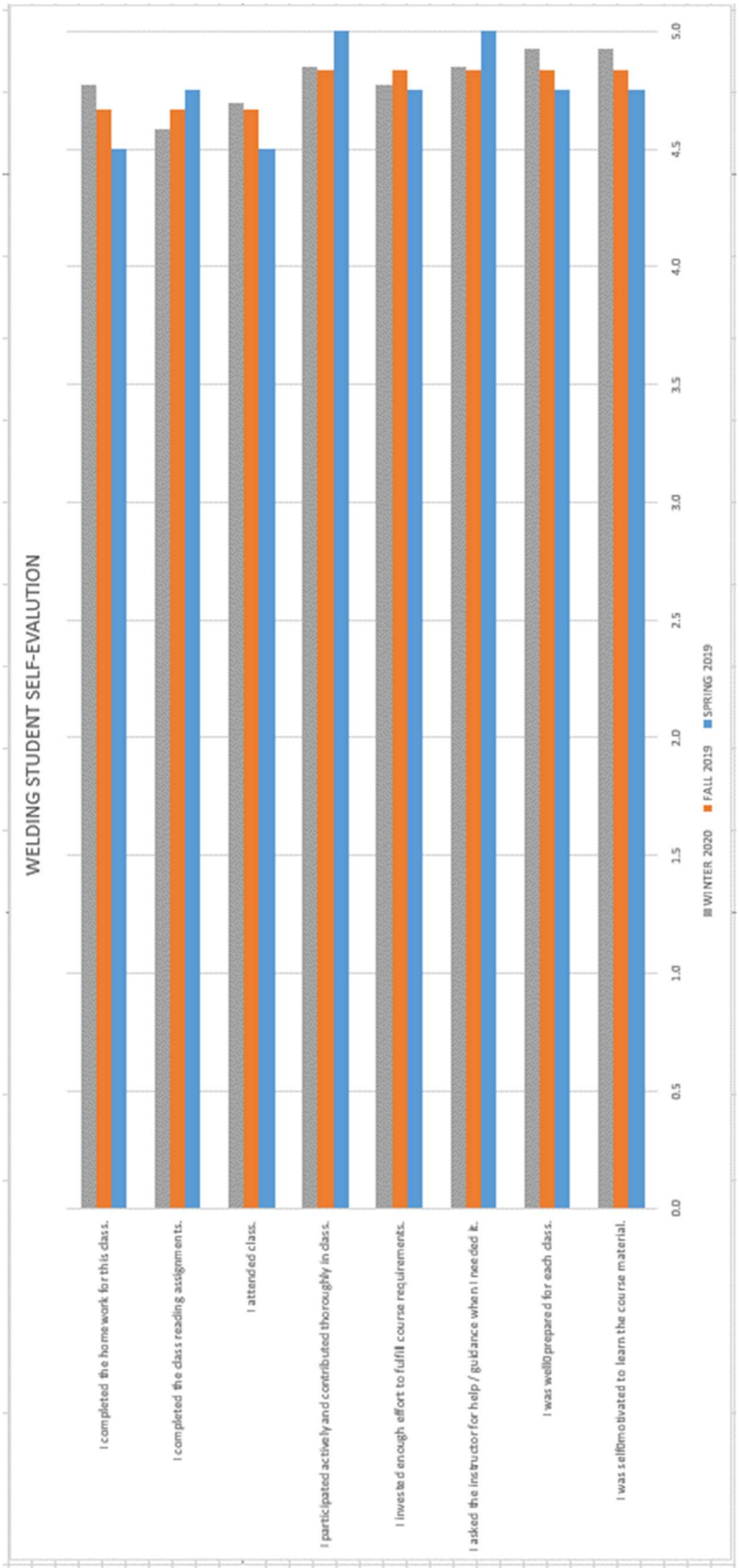
These Oregon community colleges have defined career pathway roadmaps to facilitate entry into this occupation:

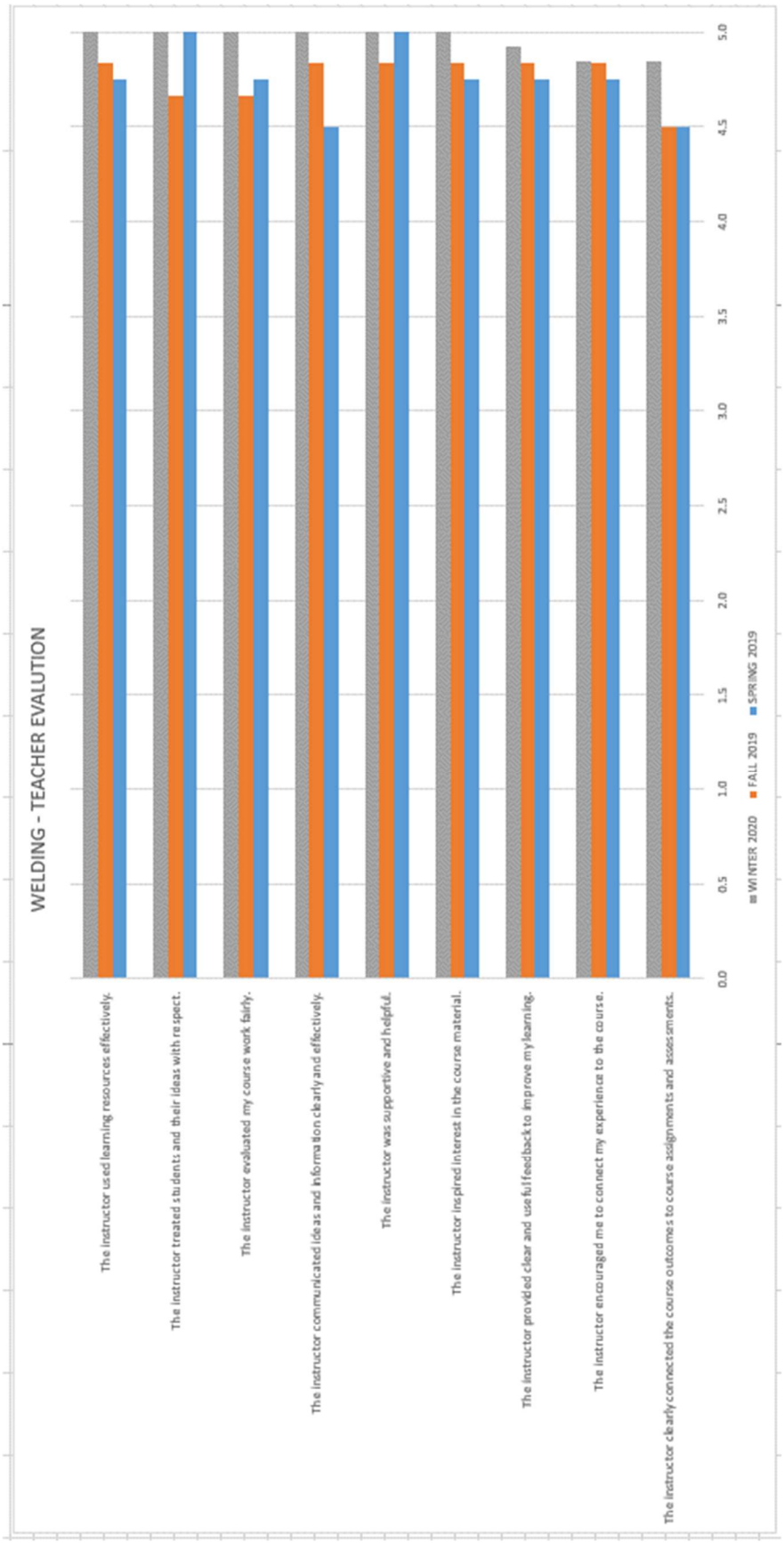
Blue Mountain Community College	Diesel Technology
	Industrial Systems Technology
	Welding
Chemeketa Community College	Welding Technology
Clackamas Community College	Welding Technology
Clatsop Community College	Welding
	Welding--Shielded Metal Arc & Gas Metal Arc

	Welding--Shielded Metal Arc & Flux Core Arc
	Welding--Shielded Metal Arc & Gas Tungsten Arc
	Welding--Gas Metal Arc & Flux Core Arc
Klamath Community College	Welding and Fabrication
Lane Community College	Welding and Fabrication
Mt Hood Community College	Integrated Metals Manufacturing
Portland Community College	Advanced Manufacturing Bridge
Rogue Community College	High Technology: Plant Systems Tech
	Manufacturing/Engineering Technology
	Industrial Welding Technology
Treasure Valley Community College	Welding Technology: Combination Welder
Umpqua Community College	Welding

8B. WELDING COURSE EVALUATIONS




WELDING STUDENT SELF-EVALUTION
I completed the homework for this class.
I completed the class reading assignments.
I attended class.
I participated actively and contributed thoroughly in class.
I invested enough effort to fulfill course requirements.
I asked the instructor for help / guidance when I needed it.
I was well0prepared for each class.
I was self0motivated to learn the course material.
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
WINTER 2020
FALL 2019
SPRING 2019


WELDING - TEACHER EVALUTION
The instructor used learning resources effectively.
The instructor treated students and their ideas with respect.
The instructor evaluated my course work fairly.
The instructor communicated ideas and information clearly and effectively.
The instructor was supportive and helpful.
The instructor inspired interest in the course material.
The instructor provided clear and useful feedback to improve my learning.
The instructor encouraged me to connect my experience to the course.
The instructor clearly connected the course outcomes to course assignments and assessments.
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
WINTER 2020
FALL 2019
SPRING 2019

INSTRUCTIONAL PROGRAM REVIEW RUBRIC

	Highly Developed	Developed	Emerging	Initial
1—Accomplishments in Achieving Goals	Exhibits ongoing and systematic evidence of goal achievement.	Exhibits evidence of goal achievement.	Exhibits some evidence that some goals have been achieved.	Minimal evidence that progress has been made toward achieving goals..
2—Labor Market Projection	Thoroughly explains projected market demand and potential effects on program; presents highly developed plan to address projection.	Explains projected market demand and discusses several possible actions to address projection.	Minimally explains projected market demand and lists one or two actions to address projection.	Presents labor market demand without analysis/explanation and fails to list possible actions to address projection.
3—Resources				
Professional Development	Exhibits ongoing and systematic support of professional development opportunities.	Exhibits support of regular professional development opportunities.	Evidence of intermittent professional development opportunities.	Minimal evidence of professional development opportunities.
Faculty Meeting Instructional Needs	Employs a sufficient number of highly qualified faculty to meet instructional needs.	Employs an adequate number of qualified faculty to meet instructional needs.	Has a plan to employ an adequate number of qualified faculty to meet instructional needs.	Faculty numbers and/or qualifications are insufficient to meet instructional needs.
Facilities and Equipment	Facilities and resources meet current and future needs.	Facilities and resources meet current needs.	Evidence of a plan to have facilities and resources meet current and future needs.	Minimal evidence that facilities and resources meet current and future needs.
4—Effectiveness				
Student Learning Outcomes Assessment	Exhibits ongoing and systematic SLO assessment to adjust instruction.	Exhibits student learning outcomes assessment and uses results to change instruction.	Has a plan to engage in ongoing and systematic SLO assessment, including using results to change instruction.	Minimal evidence of SLO assessment.

Student Success	Thoroughly analyzes trends in enrollment, degrees awarded, time-to-completion rates, and formulates comprehensive plans to address them.	Describes trends in enrollment, degrees awarded, time-to-completion rates, and formulates plans to address them.	Describes trends in enrollment, degrees awarded, time-to-completion rates, and makes an attempt to plan to address them.	Minimal description of trends and/or fails to formulate plan to address them.
5—Budget	Financial resources meet current needs and are projected to meet future needs.	Financial resources meet current needs.	Evidence of a plan to acquire financial resources to meet current needs.	Minimal evidence that financial resources meet current needs.
6—Strengths and Weaknesses	Strengths and weaknesses are described accurately and thoroughly.	Most strengths and weaknesses are described accurately and thoroughly.	Some strengths and weaknesses are described accurately and thoroughly.	Minimal evidence that strengths and weaknesses are described accurately and thoroughly.
7—New Goals and Plan	Multiyear planning process with evidence of use of assessment data in planning.	Multiyear planning process with some assessment data.	Short-term planning process recently implemented.	Minimal evidence of planning process.
8—Overall Evaluation	Evidence of ongoing systematic use of planning in selection of programs and services.	Exhibits evidence that planning guides program and services selection that supports the college.	There is evidence that planning intermittently informs some selection of services to support the college.	Minimal evidence that plans inform selection the of services to support the college.
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