

# **Eastern Wyoming College**

## **Instructional Program Review 2017-2020**

**Program:  
Welding and Machine Tooling**

**Prepared by:  
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## EASTERN WYOMING COLLEGE Instructional Program Review

**Program Name:** Welding and Machine Tooling

**Part I: Statistical Data from the past three years:**

Machine Tool Technology	2016-2017	2017-2018	2018-2019	5-Year Average
Annualized FTE Enrollment	6.5	6.6	7.3	7.1
Annualized FTE Faculty	0.6	0.6	0.6	0.6
# Students	0	2	2	0.8
# Graduated	4	11	9	9.4

Welding Technology	2016-2017	2017-2018	2018-2019	5-Year Average
Annualized FTE Enrollment	79.9	71.3	86.1	85.9
Annualized FTE Faculty	6.8	6.2	6.9	7.1
# Students	112	89	110	113.4
# Graduated	61	47	55	58.8

FTE = Full-time equivalent      Notes:

**Modes of Delivery:**

online       compressed video       face-to-face

**Advisory Committee Members and Title or Role: (if applicable)**

Welding Instructors: Lynn Bedient, Stan Nicolls, Joel Alworth, Darren Youngs

Business Partners: Tom Briggs, Western Sugar; Bryce and Brian Schlagel, Schlagel Manufacturing; Wade Bruch Pinnacle Bank; Kelly Strey, B&C Steel; Aaron Wadhams, McKinney Manufacturing; Julia McKinney, McKinney Manufacturing; Kaycee Brooks, L&H Industries

Academic: Dr. Heidi Edmunds, Dr. Debbie Ochsner, Lynn Wamboldt

**Community Partners or Internships: (if applicable)**

**Revisions in Curriculum since Last Review:**

A second year **“Welding Specialist Certificate”** was added for students interested in a welding and machining trade school type training without the academics. This Certificate proposal was presented to the Advisory Committee for suggestions and was unanimously recommended. It consists of welding core classes and allow students to choose from electives to meet their needs from Agriculture, Art, and Business.

**Semi-auto Pipe** welding and **GTAW SMAW Pipe** welding were added to the program when the third welding lab in CTEC became available. These classes were previously taught in the summer and poorly attended due to the lack of welding lab availability. These are advanced pipe welding classes that add value to our AAS degree.

**Basics in Welding and Machining** is a college studies class specific to welding and machining. It covers the essential elements needed to be successful. The core components include the history of our welding program, MyEWC and Canvas training, notes and study skills, job opportunities, cover letter and resume writing, and registration.

**Fabrication** is a nontraditional elective class that deals with applied measurement, job planning, cost and profit analysis, print reading and application, tours of local fabrication and welding operations and hands on fabrication techniques.

## **Part II: Narrative Analysis**

### **Overview**

The Welding program at EWC is focused on training to enable students to enter the working world with the essential skills and qualifications necessary to be successfully employed.

Students can choose from four training areas to meet their budget, needs, and the type of employment they are interested in.

Classes are taught with the same expectations that employment demands. Safety, attendance, cellphone use, and the soft skills of welding are embedded and enforced like a working environment. When students enter the workforce, they are aware of employer requirements.

Included in the curriculum of welding classes is qualification testing. Students are tested, evaluated, and graded by visual and destructive testing. Qualification records are given when students earn qualifications in all position testing. Many of the qualifications meet or exceed requirements of employers for employment and employee advancement.

Eastern Wyoming College Instructors are required to have an AAS degree in welding, hold an American Welding Society (AWS) Certified Weld Inspector credential, be a Certified Welding educator and have AWS Certified Welder credentials. Qualification records are required for the classes they teach. Our full-time instructors are all graduates of EWC welding, have the same philosophy, and total over 130 years of welding experience in the welding field. We are welders teaching welders, and it works.

As the welding program enters its fortieth year, it is committed to continuing top-quality welding training and student success in the job market.

### **Clarification of terms**

Qualification is the demonstration of welding skill and knowledge of requirements. Certification is the attestation the welder is properly qualified.

### **CTEC**

The CTEC building offered many new opportunities in the fall of 2017. The addition of a third welding lab and 18 large welding booths in each lab, totaling 54, allowed for new student-valued welding classes. Modern and efficient equipment, controlled climate labs, four modern classrooms, two large computer labs and a one-hundred seat theater style classroom rival any weld training facility in the State and Nation.

### **Current Offerings**

There are four levels of training available.

- A one-semester plate certificate suitable for entry level welding employment.
- The two-semester welding certificate offers three all position welding qualifications in limited thickness plate welding, training in weld testing procedures, equipment, and metallurgy. This certificate develops skills in structural welding, print reading and welding symbols, shop tools, measurement, and introductory machining experience.
- The four-semester AAS degree includes ten qualification opportunities, two unlimited thickness, all position plate welding and eight in all position pipe welding. Top shelf training is offered in unlimited thickness plate welding in two processes. Pipe welding to include pipeline, high pressure open root, and semi-automatic for piping and structural applications.
- A two-semester Welding Specialist certificate allows students to build upon the Certificate program. Core components of the AAS degree are required. Approved Electives are chosen by the student to facilitate learning in areas of interest.

A Machine Tooling Certificate is offered in conjunction and can be earned at the same time as a welding AAS Degree.

The progression of training included in the Eastern Wyoming College welding program allows students to choose the level of training and qualification needed to be successful in their career.

### **Program Impact**

The Welding and Joining Technology program remains a key component of Eastern Wyoming College. The five-year average FTE is 195, welding and machining accounts for 9.5% of the Colleges FTEs. Offering an average of 225 credit hours per year and 8.5 percent of the credit hours offered by this institution. With an average of 17 AAS degrees and 41 certificates, the Welding and Joining Technology is responsible for 29% of the college degrees and certificates.

### **COVID-19 Impact**

The welding and machining program has been impacted by the 2020 COVID-19 pandemic. Hands-on classes cannot be replicated online.

We will be working to produce quality online curriculum for classroom classes in case of an interruption. Lab class goals, progression, and outcomes will be prioritized, and addressed. Students in our department are here because they prefer face-to-face delivery and hands-on learning. They like to see, touch, and feel. They need the structure, boundaries, and direction we provide in classes as instructors, advisors, role models, and welders, to succeed.

### **Description of Community Need:**

#### *Current Community Need/Growth of Industry:*

It is sometimes thought that EWC supplies employees to the coal mines and mine service companies. This is a true statement in that students in the past have had internship opportunities and summer jobs that pay well. For the most part, it is a steppingstone where students gain job experience, use the money made to invest in a welding truck and equipment and move on in one to three years. The bulk of our students are distributed over a wide range of careers. Oil and gas extraction and distribution, structural and pipe fabrication business, power plants, ethanol plants, refineries, large and small fabrication and repair shops, contracting and private business owners. More and more of our students return to the farm and ranch to use their skills

The **Eastern Wyoming College Test Center** recently celebrated twenty-five years of AWS accredited weld testing service, providing weld testing for local and regional businesses and individuals. The weld test center runs in conjunction with classes and in the summer when needed, conducting AWS structural plate, ASME and API pipe testing along with Certified Welding Inspector services. In the past three years the Test Center has provided the following services earning over \$12,000 in revenue.

- 7 prepared plate tests
- 10 bend and inspection only tests
- 7 pipe tests
- 18 one-inch plate tests
- 34 3/8 plate test
- 4 welder test trainings

### **Description of State and National Trends (if applicable)**

United States	Employment		Percent Change	Projected Job Openings
	2018	2028		
51-4121.06 - Welders, Cutters, and Welder Fitters	424,700	439,100	3%	48,800
Wyoming	Employment		Percent Change	Job Openings
	2009	2019		
51-4121.06 - Welders, Cutters, and Welder Fitters	1,990	2,380	20%	270

Wyoming source: Projections Central [2016-2026 long-term projections](#) . United States source: Bureau of Labor Statistics [2018-2028 employment projections](#) . "Projected growth" represents the estimated change in total employment over the projections period. "Projected annual job openings" represent openings due to growth and replacement.

**State and National Wages** from <https://www.onetonline.org/link/localwages/51-4121.06?st=WY&g=Go>

Location	Pay Period	2019				
		10%	25%	Median	75%	90%
United States	Hourly	\$14.17	\$16.80	\$20.43	\$25.17	\$30.89
	Yearly	\$29,470	\$34,930	\$42,490	\$52,350	\$64,240
Wyoming	Hourly	\$17.33	\$21.91	\$27.85	\$35.97	\$43.84
	Yearly	\$36,060	\$45,570	\$57,920	\$74,820	\$91,190

Source: Bureau of Labor Statistics [2019 wage data](#)

**Activities in Support of Student Recruitment and Retention** (if applicable)

The heavy workload that instructors carry makes it difficult to allow time away from work to recruit. We are usually not able to cover classes and must cancel class for illness and emergencies. Finding a suitable adjunct or replacement has not been fruitful. We demand that students attend class; it is contradictory if we do not.

We lose students by attrition. They slowly understand they do not like welding. They slowly understand that they are not good at it. They slowly understand that welding is not the easiest program on campus, and it is not the goof around class they liked in high school. Some just cannot get up before noon or be on time. Some never wanted to attend but Mom and Dad thought anyone can be a welder and were wrong. Some just cannot leave the drugs and alcohol alone.

Most who return to graduate love welding and are excited about where it can take them. Students are retained by the step-by-step progression of classes, self-improvement, and testing. Students will take 55 welding tests and 50 written tests for an AAS degree and are motivated to earn Eastern Wyoming College qualification records.

**Assessment of Student Learning:** *Analysis of Student Learning. Include placement if known. Statistical Data Results*

Student learning in the WJTK.AAS is assessed through the following:

- AWS ASME Pipe Test 6" Pipe
- AWS Society Unlimited Plate Test
- Eastern Wyoming College Written Exam

*American Society for Mechanical Engineers Pipe Test*-this is a national standard welding qualification test used by industry that we administer to students at the end of their second year. In 2017-18, 22 students took the test, and 11 failed. This test holds students to the high standards set forth by the AMSE Boiler Code Section IX. The students also took an AWS Unlimited Plate test that is also an industry standards used for structural buildings and the mines. 22 students took the AWS Unlimited Test, and 18 passed. All students took a written final that tests their knowledge of Welding Procedures, Blueprint Reading, Metallurgy and Science, and Welding Knowledge. This test is based off of the AWS Weld Inspection Test. All students took the test and the average score was a 68% percent.

Student learning in the WJTK.CD is assessed through the following:

- EWC Certificate Exam Written Test
- AWS D1.1 Limited Thickness 3/8" Plate Test

Students were given a pre-examination in WELD 2670 Welding Inspection in the Fall 2017. Students were given the same test in WELD 2680 at the end of spring semester to show growth in welding knowledge and competencies 27 students participated. Students had an average score of 75%. The students also improved their test scores by an average of 14.5%. The test administered covered all topics in first year welding classes including; Weld Inspection, Metallurgy, Print Reading, and Machining. Twenty-seven students also took the 3/8" AWS D1.1 Limited Thickness Structural Plate Test; 24 passed and 3 failed.

*What has been learned?*

Recommendations

- Stronger Attendance policy enforced.
- Students need more time welding.
- Also, adding questions to the test regarding future employment and goals to better meet student needs.
- Policies and Procedures of Eastern Wyoming College enforced better. (i.e., safety, break times).
- With the increased cost in steel and the projected number of students for the 2018-2019 year, the budget for consumables may become an issue.

**Strengths of the Program and Faculty:**

The welding faculty and class content continue to be the strengths of the program. Instructors with an AAS in welding and real-world experience are paramount to student success. Instructors with a Welding AAS have been trained to weld and can refer to that training when teaching. The ability to answer questions and relate them back to job experience is well respected. The AWS Test Center and AWS Certified Welding Inspector/ Educator credential required for all instructors add integrity to the program. Finally, proven Curriculum from *The Hobart Institute of Welding Technology* is used in our welding classes and modified to fit our college credit courses.

### **Part III: Recommendations**

#### **Faculty Recommendations:**

*Continuous Improvement Plan - (needed assessments, changes to improve student learning (review/write student learning outcomes), equipment, curricular changes, budget, faculty/staff, recruitment and retention efforts, faculty development, new initiatives, grant writing, mission relevancy)*

#### **Action Plans - Year One through Year Three**

##### **Program Goals**

- Maintain our reputation as the premier welding educational center in Wyoming by not losing site of the philosophies and techniques that have made us successful for 40 years.
- Promote and increase student enrollment by improving our website.
- Prepare for increased enrollment and instructor retirement by identifying potential new full-time and adjunct instructors.
- Work within the budget and staffing limitations to address the changing technologies in the welding and machining fields
- Enhance our partnership with agriculture while maintaining our relationship with energy extraction and transportation, Fabrication, and contract welding.
- Ensure our students are qualified to enter the workforce with a foundation on which to build their career.
- Use the Soft Skills of welding daily as instructors, and pass them on to our students

##### **Department Recommendations**

- Develop proactive plans to reduce or eliminate the impact of the continuing COVID-19 pandemic.
- Develop a plan for the continuation and expansion of the Machine Tool Program by hiring a highly qualified Machine Tool instructor with a background in CNC.
- Prepare a proactive, not reactive, plan for two retirements, within the next three years, in welding, machining, and shop coordinator positions.
- Meet as a department regularly to discuss questions, concerns, schedules, plans, and continue strong communication.
- Continue strong communication and coordination with Administration.

**Advisory Committee Recommendations:** (alumni, employers, and other external constituents who understand the relationships among the courses of study, the currency, the curriculum, and the utility of the knowledge and skills gained)

The Advisory Committee meetings were responsible for ideas and approvals of Soft Skills of Welding, Fabrication Class, and New Safety instruction included in Basic SMAW, continuing core curriculum, Ag Partnership, and FFA Welding contest.

New recommendations include expanded Computer Aided Cutting, Fabrication, Robotics, CNC lathe and machining capabilities. These aspects have been addressed in our Strategic Plan.

##### **Department Head Recommendations:**

The American Welding Society has predicted a 250,000 shortage of welders by the year 2025. Companies are scrambling to increase their welding capabilities without increasing their cost due to demand. Trends are to recruit welders out of high school, train them in the skills that they need while employing them at a reduced rate. It looks like a lucrative option in that there is no training or college debit. In the end their employees are limited in skills and employment opportunities and more likely to remain with the company at lower wages.

We have been approached to partner with area companies to use their facilities to train students, without pay, to produce products that they sell, or assemble products form material they furnish in a fabrication class for their profit.

I hope that we can continue to give our students, with the offerings we have, the type of education that will enable them to learn and grow within their field, without being taken advantage of for profit.

In this information age our students can glean information at a moment's notice form their cellphone. It is imperative that we improve our website with videos, pictures, virtual tours, and endorsements that catch their eye and leave the reading material for their parents.

### **Summary**

Our welding program began in 1980 with a one-year certificate. As a member of that first class, I have always felt that the superior welding instruction I received gave me an advantage in the job market and advancement. An emphasis on welding hand skills, theory, and weld testing, presented in a maintenance platform, enabled students to be successful in procuring and advancing at their jobs. This success is also the success of the program. Students continue to come from a five to seven state area because they know someone that is pleased with their training and successful. Our students are the best advertising.

The founder of the EWC welding and machining program was Leland Vetter, an artisan welder and welding instructor. He practiced and improved his trades judiciously and passed his skills and enthusiasm on to his students and instructors. He passionately believed that students had to weld from the first day and as much as possible to become proficient in all the processes. Instructors had to have real world welding experience and exceptional skill in welding and teaching. They had to be able to identify when students really wanted to learn and be ready to give them that knowledge. Instructors need to be willing to learn and embrace change. As a tool and die machinist, he also understood the importance that shop skills played in developing quality maintenance employees and wisely included bench shop and machine tool technology in the maintenance welding program at EWC. Value was placed on producing a student that was orderly, detail oriented, and highly skilled. A worker with good character, a willing attitude, and the skills necessary to learn and do anything the job required. These are the roots of our program. After forty years they are relevant, enduring and remain.

**Vice President's Recommendations:**

The welding department faculty and Department Head have provided a comprehensive and valuable assessment of its programming. In my interaction with the program, I have found them deeply committed to maintaining the integrity of their program while adapting to meet industry and employer needs. The department relies on input received through its advisory board which consists of not only industry partners but current and former students. Some significant additions to the program that have originated from input from this group include the second year welding certificate and the implementation of a program-specific freshman foundations class to prepare students for employment in the welding and machining industry.

During the past five years, the Welding and Machine Tool Technology program has accounted for nearly 30% of the degrees and certificates conferred at EWC. This firmly establishes it as a cornerstone of career and technical education at the institution. The program has seen some fluctuations in enrollment that generally mirror enrollment trends of the institution. Presently, there is little opportunity for a significant increase in enrollment because of full workload of existing faculty and a lack of laboratory space and open time. While the CTEC building has modernized and allowed for expansion of the program, it has nearly reached its capacity. The addition of faculty and evening/weekend hours would need to be pursued in order to add significant enrollment. I encourage the welding faculty to focus their efforts on assessing and maintaining program outcomes and setting appropriate completion goals.

Finally, I respect the review and planning in which the department continually engages. It is apparent that the need will present itself in the future to locate not only qualified instructors to either supplement or replace retiring faculty, but also secure individuals who embody the core values of the program.