Luna Community College

Welding Technology

Certificate

2017/2018

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WELDING TECHNOLOGY
Certificate
Minimum of 31 Credit Hours

Program Goals
The program prepares students with entry-level job skills in all phases of the welding industry and provides upgrading for those out in the field that need to acquire additional skills

2015/18 Curriculum Profile(click to follow link)
Emphasis is placed on welding procedures used in the construction industry. Preparation for state certification is covered through the American Welders Society (AWS).

Completion of this certificate can be applied toward the Associate of Applied Science Degree in Vocational/Technical Studies.

Institutional Proficiency Requirements
In addition to the courses listed below for this program of study, students must also complete institutional proficiency of ENG098.

Program Map
The program map marks courses that are scheduled by semester in order to complete this degree within on year. Refer to Appendix A for the program map.

Professional Development
Instructor did not participate in any professional development this academic year.

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Courses Offered by Semester

Fall 2017

WLDG105 01 3.0 Introduction to Welding	WLDG119 01 4.0 Welding Level I Application	WLDG133 01 4.0 Pipe and Plate Code Testing
WLDG230 01 4.0 Welding Level III		

Spring 2018

WLDG105 01 3.0 Introduction to Welding -M-W---	WLDG119 01 4.0 Welding Level I Application -M-W---	WLDG133 01 4.0 Pipe and Plate Code Testing --T-R--
WLDG230 01 4.0 Welding Level III	WLDG230 01 4.0 Welding Level III	

Summer 2018

No classes were offered	

Retention Rates Fall to Spring

	Total Fall Enrollment #*	**Spring Enrollment**
2015-16	**81**	**68**
2016-17	**52**	**60**
2017-18	**77**	**63**

Program Student Enrollment (Three-Year Annual Trend)

2015/2016	2016/2017	2017/18
90	82	89

Fall 2017 Course	Credit	# Students Enrolled	Student Credit Hours
WLDG105 01 3.0Introduction to Welding	3	15	45
WLDG119 01 4.0Welding Level I Application	4	13	52
WLDG133 01 4.0 Pipe and Plate Code Testing	4	11	44
WLDG230 01 4.0Welding Level III	4	11	44

Fall By Course

Spring By Course

Course	Credit	# Students Enrolled	Student Credit Hours
WLDG105 01 3.0 Introduction to Welding	3	10	30
WLDG119 01 4.0 Welding Level I Application	4	9	36
WLDG133 01 4.0 Pipe and Plate Code Testing	4	8	32
WLDG230 01 4.0 Welding Level III	4	11	44
WLDG148 01 3.0 Ornamental Art Welding	3	14	42

Summer By Course

Course	Credit	# Students Enrolled	Student Credit Hours
No summer classes offered			

Student Graduation (Three-Year Annual Trend)

2015/2016	2016/2017	2017/18
6	2	3

Synopsis of Significant Findings

- This is a popular program the Trades Dept.
- Students drop out after completing their welding exam certification.
- It must be noted however, that courses for completion of the entire program are not being offered.

Program Improvement Plans Implemented or In-Progress

- To create a shorter welding certificate.
- Offer the full range of welding classes so that students could obtain a LCC Welding Certificate as well as their AWS certification.

Advisory Committee Work

- An advisory committee needs to be created.

Student Advisement by Semester

- A fulltime advisor in the Trades Dept could help with the Welding program's retention rates.
- Right now, the director or the Automotive Technology instructor acts as the advisor for Welding.

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Yearly Return on Investment

Costs for instruction are listed by course.

Revenue

				Total Students	Student Credit Hours	Tier	Tier Funding total (SCH X $199)	Tuition ($38 X # of Students)	Total Revenue
Welding-REVENUE									
			WLDG105	15	45		$8,955	$570	$9,525
			WLDG119	13	52		$10,348	$494	$10,842
			WLDG133	11	44		$8,756	$418	$9,174
			WLDG230	11	44		$5,970	$418	$6,388
			WLDG105	10	30		$5,970	$380	$6,350
			WLDG119	9	36		$7,164	$342	$7,506
			WLDG133	8	32		$6,368	$304	$6,672
			WLDG230	4	44		$8,756	$152	$8,908
			WLDG148	3	42		$8,358	$114	$8,472
			Totals	84	369		$70,645	$3,192	$73,837

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Costs

1718 Costs-Welding				
FT Instructor	**Instructor Salary**	**Fringe**	**Operational Costs 63&64**	**Total Costs**
Donnie Adkins	$35,282.88	$2,456.37	$1,110.00	$38,849.25
PT Instructor				
Michael Jaramillo	$ 1,950.00	$ 126.24	$1,110.00	$ 3,186.24
Totals	$37,232.88	$2,582.61	$2,220.00	$42,035

Class Cost Per Student (e.g., Revenue-Costs/students enrolled)

$357.32

Cost per Graduate (e.g., Revenue-Costs/students graduated this year)

$10,600.66

Alumni Surveys

No alumni surveys were completed.

Program Learning Assessment Plan

Appendix B provides the program assessment of learning plan created by the faculty.

Student Alumni Surveys

No student alumni surveys were completed.

Curriculum Committee Work

Donnie Adkins, Dr. Rael (former Vocational Director), and Rick Baca (current director) have proposals to submit to the Curriculum Committee for consideration of a shortened (mini) Welding Certificate.

Final Program Approvals (Board of trustees) approvals to move program forward

N/A

Accreditation

The Welding Technology Program is not accredited, but students can obtain their American Welding Society certification(a national certification) through the welding program.

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Evaluation of the Program

- Highly qualified instructor.
- Need a qualified adjunct instructor.
- Need a fulltime instructor because the current instructor is ill and looking to retire soon.
- The program needs to be geared to offer shorter certificates to help students achieve their certificate.
- Recruiting from outside the area would help increase enrollment.
- Create matriculation agreements with local unions to help students connect to the workforce.

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Appendix A:

Program Map for CERTIFICATE in Welding Technology

Term 1 / Fall Semester	Credits	Term 2 / Spring Semester	Credits
WLDG105-Introduction to Welding	3	**VOC117**-Blueprint Reading & Construction Math	4
VOC109-Fundamentals of Vocational Education	4	**WLDG119**-Welding Level I Application	4
WLDG118-Welding Level I	3	**WLDG211**-Welding Level II	3
2 Electives of their choice	6	**WLDG230**-Welding Level III	4
Semester Total	**16**	**Semester Total**	**15**
Milestones		**Milestones**	
Complete (or test out) Math 075, and/or Math 095 and Math 116 to get into Math 180		Complete all Term 2 courses with a letter "C" grade or better	
Meet with Advisor		Meet with Advisor	
Accumulate 15 or more credits		Accumulate 30 or more Credits	
Maintain a 2.0 GPA or higher		Maintain a 2.0 GPA or higher	
Complete ENG 078 and/or ENG 098 to place into ENG 111		Apply for, test and gain AWS **Welding Certification**	
Enroll in Term 2		Apply for graduation	
		Graduate with a certificate	

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Appendix B: Program and Student Assessment of Learning

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Summary

With the loss of the fulltime instructor, consistent assessment materials of the Welding Technology Program is not available.

Included in this packet is a Student Learning Outcomes Assessment Presentation for the Welding Program and a Core Competencies Assessment.

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Welding Program
Curriculum Profile
2015-2018

LEARNING OUTCOMES COMPETENCIES

Program Goal:

The program prepares students with entry-level job skills in all phases of the welding industry and provides upgrading for those out in the field that need to acquire additional skills. Emphasis is placed on welding procedures used in the construction industry. Preparation for state certification is covered through the American Welders Society (AWS). Completion of this certificate can be applied toward the Associate of Applied Science Degree in Vocational/Technical Studies.

Institutional Proficiency Requirements
In addition to the courses listed below for this program of study, students must also complete institutional proficiencies of ENG095, MATH075 and READ095 that are outlined on page XX to meet all graduation requirements.

Certificate Requirements Credit Hours: 31
Program Requirements (25 hours)
VOC109 Fundamentals of Vocational Education 4
VOC117 Blueprint Reading and Construction Math 4
WLDG105 Introduction to Welding 3
WLDG118 Welding Level I 3
WLDG119 Welding Level I Application 4
WLDG211 Welding Level II 3
WLDG230 Welding Level III 4

Related Studies (6 hours)
WLDG133 Pipe and Plate Code Testing 4
WLDG140 Advanced Layout and Fabrication 3
WLDG148 Ornamental Art Welding 3

Course Learning Outcomes

WLDG 105: INTRODUCTION TO WELDING

This course teaches the fundamentals in the welding processes, shop orientation, and shop safety. Start with oxy/acetylene cutting and welding, and advance into basic MIG,TIG, and stick welding. Plasma cutting will be introduced. Welding will be tested in the flat, horizontal, vertical and overhead positions. Practical applications are covered and pipe welding will be introduced.

LEARNING OUTCOMES

1. Identify some of the common hazards in welding.

2. Explain and identify proper personal protection used in welding.
3. Describe how to avoid welding fumes.
4. Explain some of the causes of welding accidents.
5. Identify and explain uses for material data safety sheets
6. Explain safety techniques for storing and handling bottles.
7. Explain how avoid electrical shock while welding.
8. Identify and explain the use of oxy/fuel cutting equipment.
9. Set up oxy/fuel equipment.
10. Light and adjust an oxy/fuel torch.
11. Proper shut down of bottles.
12. Change cylinders
13. Perform oxy/fuel cutting and welding procedures.

WLDG118: WELDING LEVEL ONE

This course is the first level in the welding program. It is designed for the apprentice welder and teaches the basics in blueprinting, layout, and fabrication, pipe fitting and proper joint design necessary for various welding processes will be covered.

LEARNING OUTCOMES

1. Explain the plasma arc cutting processes.
2. Identify plasma arc cutting equipment.
3. Prepare and set up plasma arc cutting equipment.
4. Use plasma arc cutting equipment to make various types of cuts.
5. Identify and explain (SMAW) safety.
6. Explain welding electrical current.
7. Identify welding power supplies and their characteristics.
8. Explain how to set up a welding machine
9. Identify factors that affect electrode selection.
10. Identify different types of filler material.
11. Identify and select the proper electrode for a specified welding task.
12. Begin building a portfolio complete with blueprints, materials list, and pictures of completed projects.

Objectives: Air Carbon ARC Cutting and Gouging

1. Identify and explain the air carbon arc cutting (CAC-A) process an equipment.
2. Select and install CAC-A electrodes.

3. Prepare the work area and CAC-A equipment for safe operation.
4. Use CAC-A equipment for washing and gouging activities.
5. Perform storage and housekeeping activities for CAC-A equipment.
6. Make minor repairs to CAC-A equipment.

WLDG119: WELDING LEVEL ONE APPLICATION

Basic metallurgy will be covered by using numbering systems to identify metals and conduct magnet, spark, and chisel tests to identify metals. The use of manufacturing equipment and assembly procedures, along with advanced welding theory and applications are covered. Surface padding will be introduced.

LEARNING OUTCOMES

1. Clean base metal for welding or cutting
2. Identify and explain joint design.
3. Explain joint design considerations.
4. Mechanically bevel the edge fo a mild steel plate.
5. Thermally bevel the end of a mild steel plate.
6. Select the proper joint design based on a welding procedure specification (WPS) or instructor direction.

WLDG 211: WELDING LEVEL TWO

Designed to give the intermediate welder additional time to develop specific welding skills. Students will engage in field work and receive on the job training. Shop time will be dedicated to projects and working towards AWS certification.

LEARNING OUTCOMES

1. Identify factors that affect electrode selection.
2. Explain the American Welding Society (AWS) and the American Society of Mechanical Engineers (ASME) filler metal classification system.
3. Identify different types of filler metals.
4. Explain the storage and control of filler metal.
5. Explain filler metal traceability requirements and how to use applicable code requirements.
6. Identify and select the proper electrode for and identified welding task.

WLDG 230: WELDING LEVEL THREE

This course is designed for the advanced welder and is the capstone class for the welding graduate. Course content will be based on NCCER welding applications. Students will prepare and submit coupons for the American welding society (AWS) certification test. Students will also submit a portfolio of completed projects including pictures, blueprints, and materials list. Job search and job placement are also emphasized.

LEARNING OUTCOMES

1. Identify and explain codes governing welding.
2. Identify and explain nondestructive examination practices.
3. Identify and explain nondestructive examination practices.
4. Identify and explain welder qualification tests.
5. Explain the importance of quality workmanship.
6. Identify common destructive testing methods.
7. Performa visual inspection of fillet welds.

WLDG 133: PIPE AND PLATE CODE TESTING

This course demonstrates the ability to weld beveled test plate with and without backing strip in the horizontal, vertical, and overhead position according to applicable welding standards.

LEARNING OUTCOMES

1. Identify and explain job code specifications.
2. Use fit-up gauges and measuring devices to check joint fit-up.
3. Identify and explain distortion and how it is controlled.
4. Fit up joints using plate and pipe fit-up tools.
5. Check for joint misalignment and poor fit-up before and after welding.

WLDG 140: ADVANCED LAYOUT AND FABRICATION

This course includes the proper joint design, layout techniques, and fabrication methods required of a welder. In this course, students will also study the care and use of equipment, safety in the welding industry, qualification and certification of a welder or welding operator by code. Proper techniques are practiced.

LEARNING OUTCOMES

1. Identify and explain shielded metal arc welding (SMAW) safety.
2. Explain welding electrical current.
3. Identify welding power supplies ad their characteristics.
4. Explain how to set up welding power supplies.
5. Set up a machine for welding.
6. Identify tools for weld cleaning.

WLDG 148: ORNAMENTAL ART WELDING

This course includes a fun and creative way to learn basics of welding that allows a student to make ornamental welded projects from start to finish.

LEARNING OUTCOMES

1. Student will demonstrate and explain the proper use of propane, oxygen, and acetylene for forge work.
2. Identify and understand the proper use of different hammers and chisels.
3. Use proper protective equipment in forge work.
4. Understand the proper set up of equipment used in blacksmithing work.
5. Identify different types of metal and welding processes used in blacksmithing work.

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Core Competencies Assessment-2010
Welding Technology Certificate Program

Program Competencies	Assessment Procedures	Data and Outcomes	How Results Will be Used To Make Improvements	Goals/Priorities
IV. Students will operate welding shop "business" practicing common administration duties within a fabrication shop environment, dealing with customer relationships and how to acquire and maintain new business relationships.	Completion form, quizzes, and examinations. Welding Technology fabrication, theory, creativity, project layout, and safety application. WELD116 – WELD118 WELD112 AWS/NCCER certification.	Students must demonstrate a proficiency in blueprint math, Weld 106, to be eligible for advancement. Evaluate project and written work through hands-on and written Testing. .	Better welding math resources are required. Familiarization with CAD drawing would be to the student's best interest.	Achieve 80% pass rate in. Encourage continuing education in business and or education.
V. Students will develop welding skills that illustrate both individual abilities as well as team abilities.	Capstone project. Written examination, hands-on fabrications, portfolio, and resume. WELD 295	Evaluate through comprehensive hands on and theory testing. Job placement and tracking.	Projects will be broken down into stages in an effort to encourage quality workmanship. Introduce project portfolios, project notebooks, completion forms and resumes to program.	Ultimately if student wants to weld professionally they must pass AWS certification.

Luna Community College
Core Competencies Assessment-2010
Welding Technology Certificate Program

Program Competencies	Assessment Procedures	Data and Outcomes	How Results Will be Used To Make Improvements	Goals/Priorities
I. Welding theory and AWS standards are demonstrated and practiced by students.	Students will pass each module of AWS/NCCER before they are eligible to advance. WELD100 –WELD102	Pass Rates: Pass or Fail If fail students will be permitted to retake. Projects performed and assessed.	Revisions in curriculum. Emphasis in areas of weakness. Set up student industry practice groups.	AWS weld certification. Industry competitive students.
II. Students will be trained to recognize AWS standards of professionalism and work ethic.	Students are required to wear all safety equipment any they enter the shop, no exceptions. AWS standards and shop procedures will be emphasized in lecture and demonstrated in shop. Students will be assessed on work ethic, promptness, safety violations, and quality of work. WELD103 – WELD104 WELD108	More work is needed in this area. Ultimate outcome is AWS certification by all students. Pass OSHA 10 hour course to certify as a safety requirement. Practical project application	Students are strongly encouraged to concentrate on areas of weakness. Students will have one-on-one assessments to evaluate progress. Student industry practice groups will be established to acquaint students with industry requirements and expectations. Student leaders are strongly encouraged to mentor classmates and project team members.	Establish reputation for student industry proficiency.
III. Students will demonstrate competency of AWS welders.	Students will maintain a project notebook and completion forms for each shop module. Final exam will include test, hands-on fabrication, and tool selection. WELD106	Students must have a complete understanding of theory in AWS standards to succeed, as individuals and as a team. Students will master both theory and practical elements to be advanced.	Prior to final exam students will have industry modules to complete blueprints, sketches, welding fabrications and final product to be presented as a team to instructors and classmates. Students will be able to schedule	Achieve a 90% pass rate with AWS.

Welding Technology

Student Learning Outcomes Assessment

Don Adkins, Instructor

Course Level Learning Objectives

#1 Demonstrates Shop and Equipment Safety

#2 Demonstrates Basic Task and Operations of Welding Equipment

#3 Demonstrates proper use of basic fixtures and Welding Equipment

#4 Consistently Demonstrates the Proper Procedure for Safe Welding

#5 Will Apply Correct AWS Procedures for Testing Welds

#6 Pass the AWS Certification Test

Assessment Tools

*Welding is a hands-on learner-centered curriculum, where the instructor constantly monitors the students as they progress with their skills. The primary assessment tool in the welding program is constant feedback during the training process.

*The AWS test reflects how well the skills were communicated from instructor to student

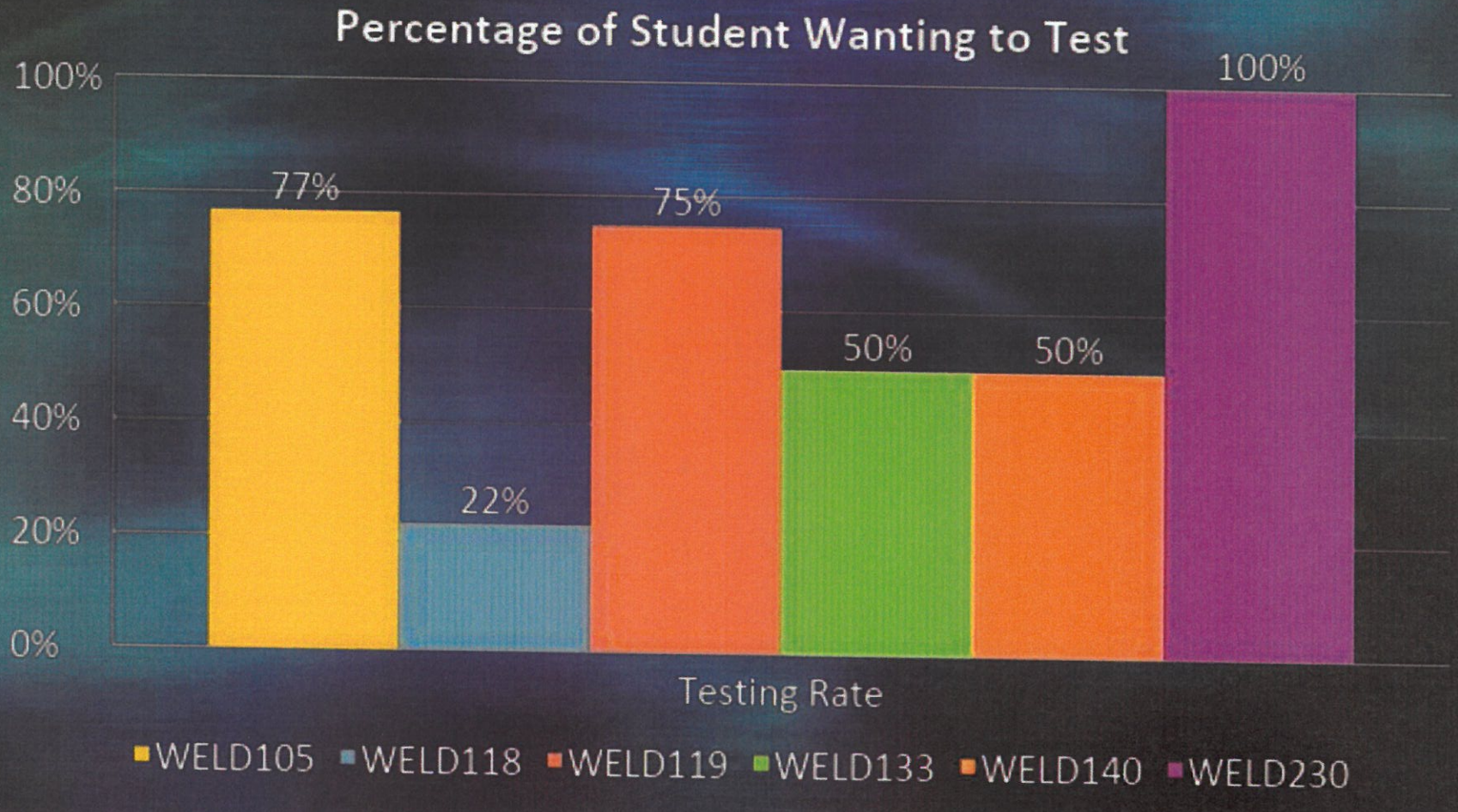
Data and Results

Student skill level in each welding course is based on a "Pass" or "Fail" performance. There is no room for error when it comes to a critical weld.

Note: There were some students that of their own choosing did not take the AWS test. Outcome #6 does not account for these students who opted out of the test.

Data and Results

This data is a subset of the data for outcome #6



Data and Results

- There were 36 students (unduplicated) that were enrolled in welding courses during the spring semester, with only one withdrawal (97% semester retention)
- 100% of the students retained in all welding classes successfully met all five outcomes
- Twenty two students took the AWS test (outcome #6) with only two failing (91% pass rate).
- 34% of enrolled students did not take the test, for one reason or another dropping the overall test pass rate to 60%.

Analysis

- Area of Excellence

  - All students (100%) passed the required skill levels for the first five learning outcomes specific to the course,
  - The sixth learning outcome (AWS test) was both course and program related (91% pass rate)

- Best Practice

  - Continue with strong student-instructor interactions
  - Continue with instructor demonstration of important skills and procedures
  - Continue constant feedback as students learn to weld and acquire other skills (e. g. cut, fit, grind, etc.)

Analysis

- Needs for Improvement
  - Getting more students to take the AWS test that are industry bound
  - Students not testing because they lack confidence will continue to be mentored so that they gain the confidence to test and pass.
  - The cost of the exam can also inhibit their desire to test, not everyone can afford it. Help students find ways to pay for exam

* Other

students interested in using their welding skills at home will not be pressured to take the exam, but are trained as if they were. May have them prepare plates as if they were to be tested so that their exiting skill levels can be evaluated.

Analysis

- Proposed Changes
  - Addition of simulation welders
  - Make more efficient use of new equipment
  - Take advantage of facility upgrade (e.g. new ventilation will enhance the learning environment)

-Less safety concerns