Washtenaw Community College Comprehensive Report

WAF 116 Ironworker Pre-Apprenticeship Shielded Metal Arc Welding
Effective Term: Fall 2020

Course Cover

Division: Advanced Technologies and Public Service Careers
Department: Welding and Fabrication
Discipline: Welding and Fabrication
Course Number: 116
Org Number: 14600
Full Course Title: Ironworker Pre-Apprenticeship Shielded Metal Arc Welding
Transcript Title: SMAW for Ironworkers
Is Consultation with other department(s) required: No
Publish in the Following: College Catalog , Web Page
Reason for Submission: Course Change
Change Information:
Course description
Pre-requisite, co-requisite, or enrollment restrictions
Outcomes/Assessment
Objectives/Evaluation
Other:
Rationale: This course is being updated to better align with the Ironworkers Pre-Apprentice certificate.
Proposed Start Semester: Winter 2020
Course Description: In this course, students will be introduced to the Shielded Metal Arc Welding (SMAW) and the Carbon Arc Cutting and Gouging (CAC/G) processes and how these processes are applied in the Ironworker trade. Students will learn to apply SMAW to various joint designs on plate and structural shapes in multiple positions and perform CAC/G techniques on steel with the various types of CAG electrodes. Welding vocabulary, welding theory, basic electricity, personal protective equipment, (PPE), equipment troubleshooting, safety precautions and safe work practices will be covered along with an introduction to weld quality. The title of this course was previously Shielded Metal Arc Welding for Ironworkers. This course is required for the Ironworkers Pre-Apprenticeship Certificate.

Course Credit Hours

Variable hours: No
Credits: 4
Lecture Hours: Instructor: 30 **Student:** 30
Lab: Instructor: 90 **Student:** 90
Clinical: Instructor: 0 **Student:** 0

Total Contact Hours: Instructor: 120 **Student:** 120
Repeatable for Credit: NO
Grading Methods: Letter Grades
Audit
Are lectures, labs, or clinicals offered as separate sections?: NO (same sections)

College-Level Reading and Writing

Reduced Reading/Writing Scores

College-Level Math

No Level Required

Requisites

Prerequisite minimum grade "C"
WAF 110
and
Prerequisite minimum grade "C"
WAF 114
and
Prerequisite
Academic Reading Level 3, Academic Writing Level 2

General Education

Degree Attributes
Below College Level Pre-Reqs

Request Course Transfer

Proposed For:

Student Learning Outcomes

1. Set up equipment, and perform a Shielded Metal Arc Weld.
   Assessment 1
   Assessment Tool: Student project
   Assessment Date: Fall 2023
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All
   Number students to be assessed: All
   How the assessment will be scored: Departmentally-developed rubric
   Standard of success to be used for this assessment: 70% of students will achieve 70% or higher.
   Who will score and analyze the data: Departmental faculty

2. Identify proper application of processes to complete a welded project as specified on a blueprint.
   Assessment 1
   Assessment Tool: Student project
   Assessment Date: Fall 2023
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All
   Number students to be assessed: All
   How the assessment will be scored: Departmentally-developed rubric
   Standard of success to be used for this assessment: 70% of students will achieve 70% or higher.
   Who will score and analyze the data: Departmental faculty

3. Identify proper applications, terms and materials for the Shielded Metal Arc Welding and Carbon Arc processes.
   Assessment 1
   Assessment Tool: Outcome-related exam questions
   Assessment Date: Fall 2023
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All
   Number students to be assessed: All
   How the assessment will be scored: Answer key
   Standard of success to be used for this assessment: 70% of students will score 70% or higher.
   Who will score and analyze the data: Departmental faculty

Course Objectives

1. Unit 1 SMAW Overview: Define the term Shielded Metal Arc Welding (SMAW), and explain the advantages and disadvantages of the process.
2. Unit 2 SMAW safety: Identify and select the proper safety equipment for the SMAW process.
3. Unit 3 Electricity: Explain the basic principles of electricity and how to properly use power source outputs.
4. Unit 4 Principles of SMAW: Explain the basic principles of the SMAW process and the different polarities used.
5. Unit 5 SMAW equipment: Identify the optional controls of the SMAW machine and the proper power source for a particular job.
6. Unit 6 SMAW equipment setup: Demonstrate your ability to set up and maintain the SMAW equipment.
7. Unit 7 SMAW Electrodes: Identify SMAW electrode classification and characteristics.
8. Unit 7 SMAW Electrodes: Identify various electrode groups, and properly select SMAW electrodes for specific applications.
9. Unit 8 SMAW Process: Set the primary variables and initiate welding beads in the SMAW Process.
10. Unit 9 SMAW Quality: Evaluate weld quality in the SMAW process.
11. Unit 9 SMAW Quality: Troubleshoot the SMAW process.
12. Unit 10 Carbon Arc Cutting/Gouging: Explain how to use Air Carbon Arc Cutting (CAC-A), and give an overview of the process.
13. Unit 10 Carbon Arc Cutting/Gouging: Troubleshoot the common problems with the CAC-A process.

New Resources for Course

Course Textbooks/Resources

Textbooks

International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers. *Welding for Ironworkers - Student Workbook*, ed. International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers, 2016

International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers. *Shielded Metal Arc Welding - Reference Manual*, ed. International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers, 2016

Manuals

Periodicals

Software

Equipment/Facilities

Level III classroom

Reviewer	Action	Date
Faculty Preparer:		
Amanda Scheffler	*Faculty Preparer*	*Nov 08, 2019*
Department Chair/Area Director:		
Glenn Kay II	*Recommend Approval*	*Nov 08, 2019*
Dean:		
Brandon Tucker	*Recommend Approval*	*Dec 10, 2019*
Curriculum Committee Chair:		
Lisa Veasey	*Recommend Approval*	*Feb 03, 2020*
Assessment Committee Chair:		
Shawn Deron	*Recommend Approval*	*Feb 11, 2020*
Vice President for Instruction:		

Kimberly Hurns	*Approve*	*Feb 14, 2020*

Washtenaw Community College Comprehensive Report

WAF 116 Shielded Metal Arc Welding for Ironworkers
Effective Term: Fall 2016

Course Cover

Division: Advanced Technologies and Public Service Careers
Department: Welding and Fabrication
Discipline: Welding and Fabrication
Course Number: 116
Org Number: 14600
Full Course Title: Shielded Metal Arc Welding for Ironworkers
Transcript Title: SMAW for Ironworkers
Is Consultation with other department(s) required: No
Publish in the Following: College Catalog , Web Page
Reason for Submission: New Course
Change Information:
Rationale: The Ironworker's Union requested a pre-apprenticeship certificate to assist them in obtaining more qualified candidates prior to entering into their apprenticeship training program.
Proposed Start Semester: Fall 2016
Course Description: In this course, students will be introduced to the Shielded Metal Arc Welding (SMAW) and the Carbon Arc Cutting and Gouging (CAC/G) processes and how these processes are applied in the Union Ironworker Trade. The student will learn to apply Shielded Metal Arc Welding to various joint designs on carbon steel plates and structural shapes in multiple positions and properly perform CAC/G techniques on carbon steel using multiple diameter electrodes that are manufactured. Welding vocabulary, welding theory, basic electricity, personal protective equipment, (PPE), equipment troubleshooting, safety precautions and safe work practices will be covered along with an introduction of weld quality. This class is a required part of the regional Ironworker Local Union pre-apprentice certificate.

Course Credit Hours

Variable hours: No
Credits: 4
Lecture Hours: Instructor: 30 **Student:** 30
Lab: Instructor: 90 **Student:** 90
Clinical: Instructor: 0 **Student:** 0

Total Contact Hours: Instructor: 120 **Student:** 120
Repeatable for Credit: NO
Grading Methods: Letter Grades
Audit
Are lectures, labs, or clinicals offered as separate sections?: NO (same sections)

College-Level Reading and Writing

College-level Reading & Writing

College-Level Math

Requisites

General Education

Request Course Transfer

Proposed For:

Student Learning Outcomes

1. Safely set up equipment and perform a Shielded Metal Arc Weld on carbon steel plate.
   Assessment 1
   Assessment Tool: Welded plate
   Assessment Date: Fall 2017
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All
   Number students to be assessed: All
   How the assessment will be scored: Departmentally-developed rubric based on Iron Worker's Union quality acceptance criteria
   Standard of success to be used for this assessment: 80% of students will achieve 80% or higher.
   Who will score and analyze the data: Departmental faculty

2. Identify proper application of processes to complete a welded project as specified on a blueprint.
   Assessment 1
   Assessment Tool: Welded project
   Assessment Date: Fall 2017
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All
   Number students to be assessed: All
   How the assessment will be scored: Departmentally-developed rubric based on Iron Worker's Union quality acceptance criteria
   Standard of success to be used for this assessment: 80% of students will achieve 08% or higher.
   Who will score and analyze the data: Departmental faculty

3. Identify proper applications, terms and materials for the Shielded Metal Arc and Carbon Arc processes.
   Assessment 1
   Assessment Tool: Written exam
   Assessment Date: Fall 2017
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All
   Number students to be assessed: All
   How the assessment will be scored: Departmentally-developed rubric based on Iron Worker's Union quality acceptance criteria
   Standard of success to be used for this assessment: 80% of students will score 80% or higher.
   Who will score and analyze the data: Departmental faculty

Course Objectives

1. Trace early history of SMAW (Shielded Metal Arc Welding).
2. Identify various weld joints used with the SMAW process.
3. Identify welding symbols on blueprints applicable to SMAW.
4. Define various SMAW terms and applications.
5. Demonstrate proper SMAW equipment set-up and potential safety hazards.
6. Explain basic electrical theories and how they apply to the SMAW process.
7. Explain the principles and applications of SMAW on various polarities.
8. Identify SMAW equipment components and power source selections.
9. Properly set up SMAW equipment for various applications.

10. Identify SMAW consumables, selection and proper storage conditions.
11. Properly initiate, form and terminate beads.
12. Weld a butt, lap and tee weld on various thicknesses of mild steel plate.
13. Evaluate and troubleshoot SMAW welds.
14. Explain Carbon Arc Cutting and Gouging processes.
15. Identify applications for CAC and CAG processes.
16. Perform a Carbon Arc Cut on various thicknesses of mild steel plate.
17. Perform a Carbon Arc Gouge on various thicknesses of mild steel plate.
18. Perform a CAC on various sizes of mild steel pipe.
19. Perform a weld repair procedure on mild steel plate with the CAG and SMAW processes.

New Resources for Course

Course Textbooks/Resources

Textbooks
Manuals
International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers. Welding for Ironworkers Student Workbook, International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers, 06-01-2015
International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers. Shielded Metal Arc Welding, International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers, 06-01-2015
Periodicals
Software

Equipment/Facilities

Reviewer	Action	Date
Faculty Preparer:		
Amanda Scheffler	*Faculty Preparer*	*Dec 01, 2015*
Department Chair/Area Director:		
Glenn Kay II	*Recommend Approval*	*Dec 08, 2015*
Dean:		
Brandon Tucker	*Recommend Approval*	*Dec 14, 2015*
Curriculum Committee Chair:		
Kelley Gottschang	*Recommend Approval*	*Jan 21, 2016*
Assessment Committee Chair:		
Michelle Garey	*Recommend Approval*	*Jan 25, 2016*
Vice President for Instruction:		
Michael Nealon	*Approve*	*Jan 25, 2016*