

**WELD 114A Course Outline as of Fall 2020****CATALOG INFORMATION**

Dept and Nbr: WELD 114A Title: INTRO METAL FAB

Full Title: Introduction to Metal Fabrication

Last Reviewed: 3/9/2020

Units	Course Hours per Week		Nbr of Weeks		Course Hours Total	
Maximum	2.00	Lecture Scheduled	1.00	17.5	Lecture Scheduled	17.50
Minimum	2.00	Lab Scheduled	3.00	6	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	4.00		Contact Total	70.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 35.00

Total Student Learning Hours: 105.00

Title 5 Category: AA Degree Applicable

Grading: Grade or P/NP

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly:

**Catalog Description:**

An introduction to the principles and practices of metal fabrication. Emphasis is placed on safe operation of metal working tools and equipment. Covers common fabrication, manufacturing, and cost estimation methods used in industry.

**Prerequisites/Corequisites:**

For students starting Fall 2020:

Course Completion of WELD 170 and WELD 113 and MACH 161 AND; Course Completion of WELD 101, WELD 102, WELD 103, OR WELD 104.

For students enrolled Spring 2020 or earlier:

Course Completion of WELD 170 and Course completion or concurrent enrollment in MACH 161 AND; Course Completion of WELD 171.1, WELD 171.2, WELD 172.3, WELD 175A OR WELD 175B

**Recommended Preparation:**

Eligibility for ENGL 100 or ESL 100 or equivalent

**Limits on Enrollment:**

## **Schedule of Classes Information:**

Description: An introduction to the principles and practices of metal fabrication. Emphasis is placed on safe operation of metal working tools and equipment. Covers common fabrication, manufacturing, and cost estimation methods used in industry. (Grade or P/NP)

Prerequisites/Corequisites: For students starting Fall 2020:

Course Completion of WELD 170 and WELD 113 and MACH 161 AND; Course Completion of WELD 101, WELD 102, WELD 103, OR WELD 104.

For students enrolled Spring 2020 or earlier:

Course Completion of WELD 170 and Course completion or concurrent enrollment in MACH 161 AND; Course Completion of WELD 171.1, WELD 171.2, WELD 172.3, WELD 175A OR WELD 175B

Recommended: Eligibility for ENGL 100 or ESL 100 or equivalent

Limits on Enrollment:

Transfer Credit:

Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>	<b>Effective:</b>	<b>Inactive:</b>
<b>CSU GE:</b>	<b>Transfer Area</b>	<b>Effective:</b>	<b>Inactive:</b>

<b>IGETC:</b>	<b>Transfer Area</b>	<b>Effective:</b>	<b>Inactive:</b>
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<b>CSU Transfer:</b>	<b>Effective:</b>	<b>Inactive:</b>
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<b>UC Transfer:</b>	<b>Effective:</b>	<b>Inactive:</b>
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**CID:**

**Certificate/Major Applicable:**

Both Certificate and Major Applicable

## **COURSE CONTENT**

**Student Learning Outcomes:**

Upon completion of the course, students will be able to:

1. Demonstrate safe use of the tools and equipment in a welding shop.
2. Demonstrate the proper layout and fit up assembly techniques to construct basic fabricated projects.

**Objectives:**

Students will be able to:

1. Practice effective safety procedures and precautions necessary to work in today's metal fabrication shops.
2. Utilize common mathematical formulas in the process of performing metal fabrication tasks.
3. Identify and apply the different types of information included on common drawings and prints.
4. Describe the properties and characteristics of metals and how they are identified.
5. List the key components of a sheet metal fabrication quotation.
6. Use a bill of materials for the construction of a project.

7. Identify basic measuring tools and gages and explain how they are use.
8. Describe and utilize common quality control techniques and methods.
9. Name and select hand tools for specific tasks related to metal fabrication.
10. Compare the various types of sawing methods and related equipment to effectively cut metals.
11. Perform best practices for shearing and hand breaking of sheet metal objects.
12. Identify common industry grade grinding equipment and discuss how they are used in metal fabrication operations.
13. Setup and safely operate drilling equipment and related tooling.
14. Utilize the proper layout and fit up assembly techniques to construct basic fabricated projects.
15. Examine common methods of joining metal parts using welding and non-welding processes.
16. Utilize best practice methods for holding metal object in place during metal fabrication operations.

### **Topics and Scope:**

- I. Occupational Orientation
- II. Fabrication Safety
- III. Shop Mathematics
- IV. Basic Print Reading
- V. Classifying Metals
- VI. Intro Fabrication Job Estimation
- VII. Bill of Materials
- VIII. Introduction to Measurement Quality Control
- IX. Common Hand Tools Used in Metal Fabrication
- X. Saw Cutting Operations
- XI. Introduction to Shearing and Hand Bending
- XII. Grinding Operations
- XIII. Introduction to Drilling Operations
- XIV. Introduction to Layout and Fit up Methods
- XV. Metal Joining methods
- XVI. Tooling, Jigs, and Fixtures

All topics are covered in the lecture and lab portions of the course.

### **Assignment:**

#### Lecture-Related Assignments:

1. Weekly reading assignments, 10-15 pages per week
2. Notebook of class notes and handouts
3. Homework
4. Quizzes and Exams

#### Lab-Related Assignments:

1. Equipment set-up and shut down
2. Welding skills assignments
3. Fabrication projects - samples of each process
4. Final project

## Methods of Evaluation/Basis of Grade:

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because skill demonstrations are more appropriate for this course.

Writing  
0 - 0%

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems

Problem solving  
10 - 20%

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Welding skills assignments, Equipment set-up and shut down, and Fabrication projects

Skill Demonstrations  
50 - 60%

**Exams:** All forms of formal testing, other than skill performance exams.

Quizzes and Exams, Final project

Exams  
10 - 20%

**Other:** Includes any assessment tools that do not logically fit into the above categories.

Notebook and participation

Other Category  
0 - 10%

## Representative Textbooks and Materials:

Metal Fabrication: A Practical Guide. 4th ed. O'Con, Robert and Carr, Richard. FMA Publications. 2015 (classic)

Welding and Fabrication. Jeffus, Larry. Cengage Learning. 2011 (classic)

Metalworking Sink or Swim: Tips and Tricks for Machinists. Lipton, Tom. Industrial Press. 2009 (classic)

Modern Metalworking. Walker, John and Stier, Kenneth. G-W Publisher. 2018

Modern Welding. 12th ed. Bowditch, William and Bowditch, Kevin and Bowditch, Mark. Goodheart-Willcox. 2020