WELD 113 Course Outline as of Fall 2024

CATALOG INFORMATION

Dept and Nbr: WELD 113 Title: THERMAL CUTTING Full Title: Thermal Cutting Processes 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 of thermal cutting processes. Covers the setup and safe use of Oxy-fuel Cutting (OFC), Plasma Arc Cutting (PAC) and Air Carbon Arc Cutting (CAC-A) equipment

Prerequisites/Corequisites: Course Completion of WELD 170

Recommended Preparation:

Eligibility for ENGL 100 OR EMLS 100 (formerly ESL 100) or equivalent; and Course Completion or Concurrent Enrollment in MACH 161

Limits on Enrollment:

Schedule of Classes Information:

Description: An introduction to the principles of thermal cutting processes. Covers the setup and safe use of Oxy-fuel Cutting (OFC), Plasma Arc Cutting (PAC) and Air Carbon Arc Cutting (CAC-A) equipment (Grade or P/NP) Prerequisites/Corequisites: Course Completion of WELD 170 Recommended: Eligibility for ENGL 100 OR EMLS 100 (formerly ESL 100) or equivalent; and

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree: CSU GE:	Area Transfer Area	Effective: Effective:	Inactive: Inactive:
IGETC:	Transfer Area	Effective:	Inactive:
CSU Transfer	Effective:	Inactive:	
UC Transfer:	Effective:	Inactive:	

CID:

Certificate/Major Applicable:

Both Certificate and Major Applicable

COURSE CONTENT

Student Learning Outcomes:

At the conclusion of this course, the student should be able to:

1. Demonstrate setup and safe use of Oxy-fuel Cutting (OFC), Plasma Arc Cutting (PAC) and Air Carbon Arc Cutting (CAC-A) equipment.

2. Demonstrate competent hand-eye coordination necessary to control molten metal and produce aesthetically pleasing cutting in various metals.

Objectives:

At the conclusion of this course, the student should be able to:

- 1. Categorize the personal traits that employer look for in their employees.
- 2. Compare and contrast common types of thermal cutting process used in industry.
- 3. Recognize common safety hazards associated with thermal cutting.
- 4. Name the various components of an oxy-fuel gas cutting outfit.
- 5. Utilize best practice oxy-fuel cutting techniques to produce quality cuts in metal.
- 6. Identify oxy-fuel cutting operational issues and make appropriate repairs as needed.
- 7. Ascertain oxy-fuel cutting performance issues and implement effective solutions to improve cutting operations.
- 8. Classify the various components of a plasma arc cutting outfit.
- 9. Utilize best practice plasma arc cutting techniques to produce quality cuts in metal.
- 10. Identify plasma cutting operational issues and make appropriate repairs as needed.
- 11. Determine plasma cutting performance issues and implement effective solutions to improve cutting operations.
- 12. Identify the various components of an air carbon arc cutting outfit.
- 13. Apply best practice air carbon arc cutting techniques to produce quality cuts in metal.
- 14. Detect air carbon arc cutting operational issues and make appropriate repairs as needed.
- 15. Determine air carbon arc cutting performance issues and implement effective solutions to improve cutting operations.

Topics and Scope:

- I. Introduction
 - A. Overview and comparison of processes
 - 1. Plasma cutting
 - 2. Oxy-acetylene cutting
 - 3. Air-arc gouging
 - B. Tools and equipment
 - C. Safety
 - D. Speed and quality
 - E. Most common industrial applications
 - F. Materials appropriate to each process
- II. Oxy-acetylene Cutting
 - A. Lecture
 - 1. Safety
 - 2. Gases
 - 3. Tanks
 - 4. Torches
 - 5. Accessories
 - 6. Applications
 - 7. Ferrous and non-ferrous metals
 - B. Lab
 - 1. Setting up and shutting down equipment
 - 2. Cutting
 - a. Straight line cuts
 - b. Circles
 - c. Bevels
 - d. Changing cutting direction
 - e. Free-form cutting
 - f. Stack cutting
- III. Plasma Cutting
 - A. Lecture
 - 1. Safety
 - 2. Gases
 - 3. Tanks
 - 4. Torches
 - 5. Accessories
 - 6. Applications
 - 7. Ferrous and non-ferrous metals
 - 8. Stack cutting production methods
 - B. Lab
 - 1. Setting up and shutting down equipment
 - 2. Cutting
 - a. Straight line cuts
 - b. Circles
 - c. Bevels
 - d. Changing cutting direction
 - e. Free-form cutting
 - f. Stack cutting
- IV. Air-arc Gouging
 - A. Lecture
 - 1. Safety

- 2. Gases
- 3. Tanks
- 4. Torches
- 5. Accessories
- 6. Applications
 - a. New fabrications
 - b. Salvage and repair
- 7. Ferrous and non-ferrous metals
- B. Lab
 - 1. Setting up and shutting down equipment
 - 2. Groove cutting
 - 3. Weld removal
 - 4. Full penetration
 - 5. Joint preparation
 - 6. Back gouging
- V. Economics of Processes
 - A. Cost of set-ups
 - B. Production speed
 - C. Purchasing equipment

Assignment:

Assigned projects should supplement the course content

Lecture-Related Assignments:

- 1. Weekly reading assignments, 10-15 pages per week
- 2. Homework
- 3. Quizzes and Exams

Lab-Related Assignments:

- 1. Equipment set-up and shut down
- 2. Cutting projects--samples of each process
- 3. Final project: manipulate a cutting course to result in a given shape

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.

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

Homework problems

Writing 0 - 0%



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

Equipment set up and shut down; cutting projects

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

Quizzes, exams, and final project

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

Participation

Skill Demonstrations

Other Category 0 - 10%

Representative Textbooks and Materials:

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

50 - 60%

Exams 10 - 20%