WELD 113 Course Outline as of Fall 2020

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 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 ESL 100 or equivalent; and Course Completion or

Concurrent Enrollment in MACH 161
Limits on Enrollment:
Transfer Credit:
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**	Effective:	Inactive:
CSU GE:	**Transfer Area**	Effective:	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.	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.

Equipment set up and shut down; cutting projects	Skill Demonstrations 50 - 60%

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

Quizzes, exams, and final project	Exams 10 - 20%

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

Participation	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.