

SAN DIEGO COMMUNITY COLLEGE DISTRICT
CONTINUING EDUCATION
COURSE OUTLINE

SECTION I

SUBJECT AREA AND COURSE NUMBER

INDT 606

COURSE TITLE

FLUX CORED ARC WELDING

TYPE COURSE

NON FEE

VOCATIONAL

CATALOG COURSE DESCRIPTION

A course providing instruction in the utilizing of the Flux Cored Arc Welding Self Shielded (FCAW-S) processes, on ferrous materials. Topics to be covered include orientation, safety, print reading, measuring tools, material cutting, FCAW-S practices and procedures. Workplace skills including math, communications and business ethics are integrated into the curriculum. Students successfully completing this course will be prepared for entry level positions. (FT)

LECTURE/LAB HOURS

300

ADVISORIES

Satisfactory completion of the Gas Metal Arc Welding; basic computer and internet search skills.

RECOMMENDED SKILL LEVEL

A sixth grade reading level, ability to communicate effectively in the English language and a working knowledge of math.

INSTITUTIONAL STUDENT LEARNING OUTCOMES

1. Social Responsibility
SDCE students demonstrate interpersonal skills by leaning and working cooperatively in a diverse environment.

FLUX CORED ARC WELDING

PAGE 2

INSTITUTIONAL STUDENT LEARNING OUTCOMES (CONTINUED)

2. Effective Communication
SDCE students demonstrate effective communication skills.
3. Critical Thinking
SDCE students critically process information, make decisions, and solve problems independently or cooperatively.
4. Personal and Professional Development
SDCE students pursue short term and life-long learning goals, mastering necessary skills and using resource management and self advocacy skills to cope with changing situations in their lives.

COURSE GOALS

1. Provide the student with the introduction to the principles and practices of the advance FCAW-S process used in the welding industry today.
2. Provide the student with instruction and practical experience necessary to safely perform advanced FCAW-S on projects utilizing ferrous and non-ferrous materials.
3. The student will be introduced to advanced FCAW-S techniques and practices to assist in welding ferrous material projects and repairs.
4. The course will enhance the student's workplace skills including soft skills, math, communications, business ethics, etc., necessary to succeed in the welding industry.
5. To pass a simulated groove weld test using the FCAW-S in the 3G and 4G positions in conformance with approved procedures in D1.1 American Welding Society (AWS) Structural Welding Code.

COURSE OBJECTIVES

1. Demonstrate knowledge and skills related to safety requirements and practices utilized in the flux cored arc welding process in metal fabrication industry.
2. Utilize correct terminology of current flux cored arc welding process when communicating with instructors, staff and fellow students.
3. Set up, troubleshoot and safely operate various flux cored arc welding equipment found in welding industry today.
4. Demonstrate appropriate flux cored arc welding techniques and practices to assist in welding a steel plate, shape projects, and make repairs utilizing groove welds to the American Welding Society acceptable standards.
5. Demonstrate workplace skills including soft skills and skills in math, communications, business ethics, etc., necessary to succeed in the welding industry.

SECTION II

COURSE CONTENT AND SCOPE

1. Program Orientation 2 hrs
 - 1.1. Course Syllabus
 - 1.2. Program overview
 - 1.3. Facilities orientation

FLUX CORED ARC WELDING

PAGE 3

COURSE CONTENT AND SCOPE (CONTINUED)

- 2. Safety Orientation and Safety Topics 15 hrs
 - 2.1. Right to Know
 - 2.2. Material Safety Data Sheets (MSDS)
 - 2.3. Shop safety
 - 2.4. Hand tool safety
 - 2.5. Power tool safety

- 3. Print Reading 25 hrs
 - 3.1. Print concepts
 - 3.2. Print layout
 - 3.3. Print interpretation sequence
 - 3.4. Basic lines
 - 3.5. Projection methods
 - 3.6. Views
 - 3.7. Sections
 - 3.8. Details
 - 3.9. Notes
 - 3.9.1. Material list
 - 3.10. Weld symbols

- 4. Using Measuring Tools 3 hrs
 - 4.1. US Customary system
 - 4.1.1. Whole numbers
 - 4.1.2. Fractions
 - 4.1.3. Decimals
 - 4.1.4. Degrees
 - 4.2. Metric system
 - 4.2.1. Millimeter
 - 4.3. Math Functions
 - 4.3.1. Addition
 - 4.3.2. Subtraction
 - 4.3.3. Multiplication
 - 4.3.4. Division
 - 4.4. Measuring tape
 - 4.5. Compass
 - 4.6. Simple caliper (in/mm)
 - 4.7. Electronic measuring instruments

- 5. Material Cutting 10 hrs
 - 5.1. Hand cutting with plasma equipment
 - 5.1.1. Straight cutting
 - 5.1.2. Bevel cutting
 - 5.2. Machine cutting with plasma equipment
 - 5.2.1. Straight cutting
 - 5.2.2. Bevel cutting

FLUX CORED ARC WELDING
PAGE 4
COURSE CONTENT AND SCOPE (CONTINUED)

- | | |
|--|---------|
| 6. Ferrous Material Preparation | 5 hrs |
| 6.1. Power tool grinding | |
| 7. FCAW-S Practices and Principals | 235 hrs |
| 7.1. Welding wires | |
| 7.1.1. Identification of wires | |
| 7.1.2. Selection of wires | |
| 7.2. Wire characteristics and manipulation | |
| 7.2.1. Self shielding (E-71T-8-H16) | |
| 7.3. FCAW Ferrous plate and shapes projects in all positions | |
| 7.3.1. FCAW-S Ferrous plate and shapes projects in all positions | |
| 7.3.1.1. Fillet joints | |
| 7.3.1.2. Butt joints | |
| 7.3.2. Fillet weld test on ferrous plate | |
| 7.3.2.1.1.1. Self shielding (E-71T-8-H16) | |
| 7.3.2.1.1.2. Ferrous plate (1/2 inch thickness) | |
| 7.3.2.1.1.3. Ferrous plate (1 inch thickness) | |
| 7.3.2.1.1.4. 3G and 4G positions | |
| 7.3.3. Test conformance to AWS D1.1/D1.1M, Structural Welding Code – Steel | |
| 7.3.3.1.1.1. Visual Inspection to AWS Standards | |
| 7.3.3.1.1.2. Certification option at outside agency | |

APPROPRIATE READINGS

Students may be given reading assignments from the course text book, informational handouts, related trade magazines and internet articles.

WRITING ASSIGNMENTS

Typical writing assignments will include: completing assigned reports, providing written answers to assigned questions, performing arithmetic calculations as assigned and completing shop and/or job orders.

OUTSIDE ASSIGNMENTS

Students are expected to spend a minimum of one hour per day outside of the class in practice and preparation for each day in class. Appropriate assignments may include, but are not limited to: appropriate internet research, readings, preparing research reports, preparing appropriate writing assignments and studying as needed to perform successfully in class.

APPROPRIATE ASSIGNMENTS THAT DEMONSTRATE CRITICAL THINKING

Students will perform analysis and evaluation of reading and/or classroom materials and utilize this analysis in classroom discussions, writing assignments, and in performing laboratory activities. Students must select and use appropriate methods and materials needed to complete laboratory assignments.

EVALUATION

A student's grade will be based on multiple measures of performance related to the course objectives. The assessment will measure development of independent critical thinking skills and will include evaluation of the student's ability. Multiple measures may include, but are not limited to the following: quizzes, lab projects, classroom participation, and attendance.

Upon successful completion of the course a Certificate of Course Completion will be issued.

Upon successful completion of this course and Gas Metal Arc Welding a Certificate of Program Completion will be issued.

METHOD OF INSTRUCTION

Methods of instruction will include, but are not limited to, lectures, demonstrations, laboratory, audio-visual presentations and computer assisted instruction. Group and individual instructions, field trips, guest speakers, job shadowing and internships/externships may also be utilized.

This course, or sections of this course, may be offered through distance education.

TEXT AND SUPPLIES

Welding Principles and Practices, Raymond J. Sacks, Current Edition, McGraw Hill
AWS D1.1/D1.1M, Structural Welding Code - Steel, Current Edition, American Welding Society
Blueprint Reading for Welders, by A. F. Bennett, Current Edition, Delmar

Periodicals:

The Fabricator Magazine

The Welding Journal

Practical Welding Today Magazine

Web Sites:

American Welding Society (AWS), (<http://www.aws.org>)

American Society for Testing and Materials (ASTM), (<http://www.astm.org>)

American Society of Mechanical Engineers (AMSE), (<http://www.asme.org>)

Supplies:

A course syllabus and relevant handouts will be supplied by the Instructor

The student will need to provide his/her pen/pencil, notebook and the following equipment:

1. Safety glasses
2. Welding hood, full face

TEXT AND SUPPLIES (CONTINUED)

3. Burning goggles
4. Welders cap
5. Gloves, welding, extra heavy duty, leather
6. Glove, protector, aluminum
7. Gloves, metal handling, leather
8. Filter plates, glass, shade #5, #10, #11 & #12
9. Cover plates, plastic
10. Tip cleaners
11. Torch lighter
12. Wire brush, small
13. Tape measure, 25 foot, one inch wide
14. Vise grips, 10 inch
15. Soapstone holder, rectangular, with soapstone

PREPARED BY: William Borinski DATE: April 30, 2012

REVISED BY: Bob Pyle DATE: May 6, 2020

Instructors must meet all requirements stated in Policy 3100 (Student Rights, Responsibilities and Administration Due Process) and the attendance Policy set forth in the Continuing Education Catalog

References

San Diego Community College District Policy 3100
California Community College, Title 5, Section 55002
Continuing Education Catalog