

SOUTHEAST COMMUNITY COLLEGE
TRANSPORTATION OCCUPATIONS
WELDING TECHNOLOGY
COURSE SYLLABUS
January 23, 2023

I. CATALOG DESCRIPTION

Course Number: WELD1280

Course Title: Advanced FCAW Welding

Prerequisite: Approval of BNSF Training Director

Catalog Description: Theory and practice of FCAW welding with qualification test in three positions. Equipment setup, safety and safe operation are stressed.

Credit Hours: 3
Classroom Hours: 30
Lab Hours: 50
Total Contact Hours: 80

II. COURSE OBJECTIVES: *Course will cover:*

A. Arc Welding (FCAW) Lincoln Ultra Core 71A75 Dual (.045")

1. Flat pad on scrap material
2. Horizontal tee joint with a 3/8" leg
3. Flat square groove with a 1/2" root opening; 2 1/2" x 8 x 3/8" (1/4" backing)
4. Horizontal pad on scrap material
5. Horizontal inside corner joint
6. Horizontal simulated butt joint (2)
7. Horizontal v-groove with backing; Use a 1/4" root opening on 4" x 5" x 3/4" beveled late
8. Vertical up pad on scrap material
9. Vertical up inside corner joint
10. Vertical up simulated butt joint (2)
11. Vertical up v-groove with backing; Use a 1/4" root opening on 4" x 5" x 1" beveled plate
12. Overhead pad on scrap material
13. Overhead inside corner joint
14. Overhead simulated butt joint (2)
15. Overhead v-groove with backing; use a 1/4" root opening on 4" x 5" x 1" beveled plate
16. Horizontal fillet on 1 1/4" sch. 80 pipe (2F plate to pipe)
17. Horizontal fixed pipe fillet on 1 1/4" sch. 80 pipe (5F plate to pipe)

B. AWS D15.1 Welder Qualification

1. Weld profiles
 - a. Grove welds

C. Weld Layer Thickness-Flux Cored Arc Welding

D. Test Results Required

1. Visual inspection
2. Root-, face-, and side-bend tests

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES:

A. STUDENT LEARNING OUTCOMES: *Student will be able to:*

1. Identify and practice appropriate shop safety rules.
2. Identify the basic welding joints and welding positions.
3. Explain the basic theory of how the FCAW process works.
4. Select proper electrode and welding procedures according to the steel being welded.
5. Demonstrate an understanding of the AWS D15.1 code, as it pertains to qualification testing for unlimited thickness, in the 2G, 3G, and 4G positions, using FCAW.
6. Demonstrate an understanding of the AWS D15.1 weld inspection requirements and how to utilize weld inspection gages.
7. Perform lab competencies as assigned.
8. Demonstrate proper techniques in preparing test coupons.

B. GENERAL EDUCATION LEARNING OUTCOMES:

IV. INSTRUCTIONAL MATERIALS

Required Text(s): Provided by BNSF

Required Class Materials: Provided by BNSF

V. METHODS OF PRESENTATION/INSTRUCTION

A. Methods of presentation typically include a combination of the following:

VI. METHODS OF EVALUATION OF COMPETENCIES

Evaluation of student mastery of course competencies will be accomplished using the following methods. Lab competencies will be assigned a level of 0-100.

Lab Projects	10%	100-95%	A
2G Horizontal Groove Weld	20%	94-90%	B
3G Vertical Up Groove Weld	20%	<u>89-80%</u>	<u>C BNSF Min.</u>
4G Overhead Groove Weld	20%	79-70%	D
Classroom/lab Participation	10%	69% & less	F
Midterm Test	5%		
Final (Written)	<u>15%</u>		
	100%		

VII. SPECIFIC COURSE REQUIREMENTS

A. BNSF requires the student to have a minimum grade of 80%.

B. Attendance:

1. Attendance each of the 10 days of class is very important as it is difficult to make up lost time or incomplete projects.
2. Unexcused absence(s) will result in a grade reduction of one letter grade.
3. If a student must leave class because of an emergency, the following will apply:
 - a. If a student drops after completion of one-fourth of the class, no grade will appear on his/her transcript.
 - b. If the student drops after completion of one-fourth of the class but before completion of three-fourths of the class, a "W" (indicating "withdrawal") will appear on his/her transcript. A student may retake a class from which he/she dropped with the approval of the BNSF Manager of Training and the JCCC Division Administrator.

C. Late work and makeup policy:

1. Failure to turn in lab projects will affect the student's final grade.
2. Uncompleted work or assignments will be recorded as a zero (0) when the final grade is calculated.

D. Safety:

1. **BNSF Employee Safety Rules will be followed. *** While attending training, BNSF employees are considered "ON DUTY" and must comply with BNSF safety rules.**
2. Safety glasses with side shields must be worn during lab activities associated with this course.
3. When grinding with a hand grinder, BNSF requires that students wear approved face shield in conjunction with safety glasses or goggles.
4. When working in the lab BNSF requires the student to wear approved footwear.
5. In addition, all students need to strictly follow the BNSF rules regarding the proper use of personal protection equipment. The first violation will result in a verbal warning, the second will result in a grade reduction of 5%, and a third will result in a letter grade reduction and will be counseled by the BNSF Manager of Training which may result in dismissal from the class.

E. Weapons:

1. While on duty or on railroad property, employees must not have firearms or other deadly weapons, including knives with a blade longer than three inches.