

Course Title: NCCER Welding Level 1  
Syllabus

**Teacher:** DaMarcus Kendrick

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**Room:** C1

**Class Hours:** 7:45 A.M to 3:15 P.M.

**Office Hours:** 7:45 A.M. to 3:15 P.M.

**Prerequisites:** No prerequisite required

**Course Description:** This course is a two part course that meets standards for national registry with the National Center for Construction Education and Research (NCCER). The two parts are Core Curriculum, Introductory Craft Skills and Welding Level 1. The Core Curriculum must be completed before Welding Level 1.

Instruction in the Core Curriculum includes OSHA-10 safety, construction math, and introduction to hand and power tools, construction drawings, basic communication and employability skills, and material handling. Upon successful completion of this part of the course students will receive a certificate from NCCER which will be presented at honors night.

Welding Level 1 instruction includes welding safety, oxyfuel cutting, plasma arc cutting, air carbon arc cutting and gouging, base metal preparation, weld quality, SMAW equipment and setup, shielded metal arc electrodes, SMAW beads and fillet welds, Joint fit-up and alignment, SMAW groove welds with backing, and SMAW open groove welds. Units that are not completed within the year may be completed in Welding Level 2 class to complete registry requirements. All welds will be done in the flat, horizontal, vertical and overhead positions.

A display board will be made for display at county and state fair which will include a minimum of 8 welds. Individual projects may be made only after all welding test have been successfully completed.

**Lab Fees:** \$50 per student and per semester with the total of a \$100 for the year. Materials used for individual projects will be billed to the student.

\$15 of that money will go towards Skills USA membership dues.

**Course Materials:**

The school will provide the following personal protective equipment and materials:

- Welding gloves
- Safety Glasses
- Earplugs
- Welding jacket

- Appropriate tools for each lesson
- Online access to textbook
- Online access to review materials for each unit
- Welding materials to include electrodes, steel

The student must provide and wear clothing that is safe for the welding shop environment which includes:

- Welding Helmets
- Notebook
- Pencil and Pen
- Leather boots with 8 inch tops, NO Tennis Shoes (Safety boots are recommended)
- Jeans, denim without tears or frays (No sweat Pants)
- Shirt with a collar, preferably made of 100% cotton with long sleeves (No Flannel Shirts)
- Recommend a pair of cotton coveralls for when students are dressed for game days. Nylon, synthetic, and frayed clothing will not be worn unless covered with coveralls.

### **Classroom Rules:**

#### **No Cell Phones**

Respect the staff and classmates.

Be on Time! Sometimes being late is unavoidable, a pass or note from another staff member will be accepted as a legitimate excuse for being tardy. If late, time will need to be made up after school or before.

Clean up your work area at the end of the class period.

Keep an open mind to new ideas.

Evaluate your actions before you act.

### **Course Objectives:**

#### **Basic Safety**

When you have completed this module, you will be able to do the following:

1. Explain the idea of a safety culture and its importance in the construction crafts.
2. Identify causes of accidents and the impact of accident costs.
3. Explain the role of OSHA in job-site safety.
4. Explain OSHA's General Duty Clause and *1926 CFR Subpart C*.
5. Recognize hazard recognition and risk assessment techniques.
6. Explain fall protection, ladder, stair, and scaffold procedures and requirements.
7. Identify struck-by hazards and demonstrate safe working procedures and requirements.
8. Identify caught-in-between hazards and demonstrate safe working procedures and requirements.
9. Define safe work procedures to use around electrical hazards.
10. Demonstrate the use and care of appropriate personal protective equipment (PPE).
11. Explain the importance of hazard communications (HazCom) and Material Safety Data Sheets (MSDSs).

12. Identify other construction hazards on your job site, including hazardous material exposures, environmental elements, welding and cutting hazards, confined spaces, and fires.

### Introduction to Construction Math

When you have completed this module, you will be able to do the following:

1. Add, subtract, multiply, and divide whole numbers, with and without a calculator.
2. Use a standard ruler, a metric ruler, and a measuring tape to measure.
3. Add, subtract, multiply, and divide fractions.
4. Add, subtract, multiply, and divide decimals, with and without a calculator.
5. Convert decimals to percentages and percentages to decimals.
6. Convert fractions to decimals and decimals to fractions.
7. Explain what the metric system is and how it is important in the construction trade.
8. Recognize and use metric units of length, weight, volume, and temperature.
9. Recognize some of the basic shapes used in the construction industry and apply basic geometry to measure them.

### Introduction to Hand Tools

When you have completed this module, you will be able to do the following:

1. Recognize and identify some of the basic hand tools and their proper uses in the construction trade.
2. Visually inspect hand tools to determine if they are safe to use.
3. Safely use hand tools.

### Introduction to Power Tools

1. Identify power tools commonly used in the construction trades.
2. Use power tools safely.
3. Explain how to maintain power tools properly.

### Introduction to Construction Drawings

When you have completed this module, you will be able to do the following:

1. Recognize and identify basic construction drawing terms, components, and symbols.
2. Relate information on construction drawings to actual locations on the print.
3. Recognize different classifications of construction drawings.
4. Interpret and use drawing dimensions.

### Basic Communication Skills

When you have completed this module, you will be able to do the following:

1. Interpret information and instructions presented in both verbal and written form.
2. Communicate effectively in on-the-job situations using verbal and written skills.
3. Communicate effectively on the job using electronic communication devices.

### Basic Employability Skills

When you have completed this module, you will be able to do the following:

1. Explain the role of an employee in the construction industry.
2. Demonstrate critical thinking skills and the ability to solve problems using those skills.

3. Demonstrate knowledge of computer systems and explain common uses for computers in the construction industry.
4. Define effective relationship skills.
5. Recognize workplace issues such as sexual harassment, stress, and substance abuse.

### Introduction to Material Handling

When you have completed this module, you will be able to do the following:

1. Define a load.
2. Establish a pre-task plan prior to moving a load.
3. Use proper materials-handling techniques.
4. Choose appropriate materials-handling equipment for the task.
5. Recognize hazards and follow safety procedures required for materials handling.

### Welding Safety

1. Identify some common hazards in welding.
2. Explain and identify proper personal protection used in welding.
3. Describe how to avoid welding fumes.
4. Explain some of the causes of accidents.
5. Identify and explain uses for material safety data sheets.
6. Explain safety techniques for storing and handling cylinders.
7. Explain how to avoid electric shock when welding.
8. Describe proper material handling methods.

### Oxyfuel Cutting

1. Identify and explain the use of oxyfuel cutting equipment.
2. Set up oxyfuel equipment.
3. Light and adjust an oxyfuel torch.
4. Shut down oxyfuel cutting equipment.
5. Disassemble oxyfuel equipment.
6. Change cylinders.
7. Perform oxyfuel cutting: straight line and square shapes, piercing and slot cutting, bevels, washing, and gouging.
8. Operate a motorized, portable oxyfuel gas cutting machine.

### Plasma Arc Cutting

1. Explain the plasma arc cutting processes.
2. Identify plasma arc cutting equipment.
3. Prepare and set up plasma arc cutting equipment.
4. Use plasma arc cutting equipment to make various types of cuts.
5. Properly store equipment and clean the work area after use.

### Carbon Arc Cutting and Gouging

1. Identify and explain the air carbon arc cutting (CAC-A) process and equipment.
2. Select and install CAC-A electrodes.
3. Prepare the work area and CAC-A equipment for safe operation.

4. Use CAC-A equipment for washing and gouging activities.
5. Perform storage and housekeeping activities for CAC-A equipment.
6. Make minor repairs to CAC-A equipment.

#### Base Metal Preparation

1. Clean base metal for welding or cutting.
2. Identify and explain joint design.
3. Explain joint design considerations.
4. Mechanically bevel the edge of a mild steel plate.
5. Thermally bevel the end of a mild steel plate.
6. Select the proper joint design based on a welding procedure specification (WPS) or instructor direction.

#### Weld Quality

1. Identify and explain codes governing welding.
2. Identify and explain weld imperfections and their causes.
3. Identify and explain nondestructive examination practices.
4. Identify and explain welder qualification tests.
5. Explain the importance of quality workmanship.
6. Identify common destructive testing methods.
7. Perform a visual inspection of fillet welds.

#### SMAW Equipment and Setup

1. Identify and explain shielded metal arc welding (SMAW) safety.
2. Explain welding electrical current.
3. Identify welding power supplies and their characteristics.
4. Explain how to set up welding power supplies.
5. Set up a machine for welding.
6. Identify tools used for weld cleaning.

#### SMAW Electrodes

1. Identify factors that affect electrode selection.
2. Explain the American Welding Society (AWS) and the American Society of Mechanical Engineers (ASME) filler metal classification system.
3. Identify different types of filler metals.
4. Explain the storage and control of filler metals.
5. Explain filler metal traceability requirements and how to use applicable code requirements.
6. Identify and select the proper electrode for a specified welding task.

#### SMAW Beads and Fillet Welds

1. Set up shielded metal arc welding (SMAW) equipment.
2. Describe methods of striking an arc.
3. Properly strike and extinguish an arc.
4. Describe causes of arc blow and wander.
5. Make stringer, weave, and overlapping beads.

6. Make fillet welds in the following positions: horizontal (2F), vertical (3F), and overhead (4F).

#### Joint Fit-up and Alignment

1. Identify and explain job code specifications.
2. Use fit-up gauges and measuring devices to check joint fit-up.
3. Identify and explain distortion and how it is controlled.
4. Fit up joints using plate and pipe fit-up tools.
5. Check for joint misalignment and poor fit-up before and after welding.

#### SMAW Groove Welds with Backing

1. Prepare shielded metal arc welding (SMAW) equipment for open-root V-groove welds.
2. Perform open-root V-groove welds in the following positions: Flat (1G), Horizontal (2G), Vertical (3G), and Overhead (4G).

#### SMAW Open V-Groove Welds

1. Prepare shielded metal arc welding (SMAW) equipment for open-root V-groove welds.
2. Perform open-root V-groove welds in the following positions: Flat (1G), Horizontal (2G), Vertical (3G), and Overhead (4G).

### **Course Requirements:**

Test: Will be given at the end of each unit. For successful completion and registry certification each unit will have a unit test that the student must score at least 70%. Students that do not score a 70% or higher on the unit test can retake the test once, no earlier than 48 hours after the initial test was taken. Second failure will result in not certifying that unit and will have to wait one full year before retaking the exam.

These will be worth 40% of grade.

Early Work: Questions will be asked at the beginning of each class on the previous class lesson. You will be allowed to use your text and notes to answer these questions. Points will be given for writing the question and the appropriate answer. Make sure your first and last name is on the top left corner of the paper along with the date that the early work was completed. If you miss class the day because of other school activities you will be exempt from making up the early work. However it is highly recommended that you get the questions from another classmate or Mr. Nielson since these questions may be on quizzes or test at a later date. These will be worth 10% of your grade.

Performance Objectives: These are pass or fail and will be worth 40% of your grades Welds will be bend tested according to AWS/ASME standards.

#### AET Record Book:

You will maintain your Supervised Agricultural Experiences in the AET Record book online. You have the options of having an exploratory, ownership/entrepreneurial, research/experimentation, or placement/internship SAE program. Record book evaluation will be 10% of your grade.

**Grading/Evaluation:**

Test	40%
Performance Objectives	40%
Early Work	10%
AET Record Book	10%

A = 93 – 100   A+ = 99-100   A = 96-98   A- = 93-95  
B = 85 – 92   B+ = 91-92   B = 88-90   B- = 85-87  
C = 77 – 84   C+ = 83-84   C = 80-82   C- = 77-79  
D = 70 – 76   D+ = 75-76   D = 72-74   D- = 70-71  
F = Below 70 (failing, no credit for semester)

**Grading Scale**

A = 90 – 100  
B = 80 – 89  
C = 70 – 79  
D = 60 – 69  
F = 0 – 59

**Signatures**

I/We have read the syllabus for Welding NCCER 1 and have an understanding of what the course covers.  
I/We agree to provide the necessary fee of \$50 and mandatory lab supplies.

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Student

Date

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Parent(s)

Date