

# WELD-121: WELDING TECHNOLOGY 2

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**Effective Term**

Fall 2013

**BOT Approval**

12/12/2012

**SECTION A - Course Data Elements**
**Send Workflow to Initiator**

No

**CB04 Credit Status**

Credit - Degree Applicable

**Discipline**

Minimum Qualifications	And/Or
Welding (Any Degree and Professional Experience)	

**Subject Code**

WELD - Welding Technology

**Course Number**

121

**Department**

Welding Technology (WELD)

**Division**

Career Education and Workforce Development (CEWD)

**Full Course Title**

Welding Technology 2

**Short Title**

Welding Technology 2

**CB03 TOP Code**

0956.50 - \*Welding Technology

**CB08 Basic Skills Status**

NBS - Not Basic Skills

**CB09 SAM Code**

C - Clearly Occupational

**Rationale**

Welding Technology 2 is the second course in a series of 4 courses leading to a certificate or an A.S. degree in Welding Technology, Welding Technology 2 is the second course in a series of 4 courses leading to a certificate or an A.S. degree in Welding Technology.

**SECTION B - Course Description**
**Catalog Course Description**

The second semester of Welding Technology advances into Gas Tungsten Arc Welding, SMAW electrode selection and the semi-automatic processes of hardwire and Flux core. Concepts and skills are developed with TIG, stick electrodes, core wire and Inner shield in the vertical and overhead positions. Materials, preparation of joints and their design and related subjects will be covered.

**SECTION C - Conditions on Enrollment**
**Open Entry/Open Exit**

No

**Repeatability**

Not Repeatable

**Grading Options**

Letter Grade or Pass/No Pass

**Allow Audit**

Yes

**Requisites**

**Prerequisite(s)**

Previous completion of WELD-120 or WELD-130 or WELD-100 with a minimum grade of C.

**Corequisite(s)**

Concurrent enrollment in WELD-120.

**Requisite Justification**

**Requisite Description**

Course in a Sequence

**Subject**

WELD

**Course #**

120

**Level of Scrutiny**

Content Review

**Upon entering this course, students should be able to:**

Student will demonstrate fundamental knowledge and ability to work safely with electric arc welding equipment; oxyacetylene equipment and welding shop tools.

Welding 100 or 120 or 130. These courses contain a comprehensive Safety lecture component of the welding program. The student is required to pass a written Safety test with 90% accuracy before entering the welding shop.

The student is required to handle gases which are highly explosive and flammable. In addition, they will be dealing with electrical currents, grinding equipment, fire hazards, and high-pressure inert and non-flammable gases. Without proper Safety Training the student would present a very real danger to themselves, fellow students and faculty. The Safety Training required to enter the welding program is identical to the skills needed to function safely in the welding industry and is highly supported by employers and advisory committee members.

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**Requisite Description**

Course Not in a Sequence

**Subject**

WELD

**Course #**

130

**Level of Scrutiny**

Content Review

**Upon entering this course, students should be able to:**

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Welding 100 or 120 or 130. These courses contain a comprehensive Safety lecture component of the welding program. The student is required to pass a written Safety test with 90% accuracy before entering the welding shop.

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**Requisite Description**

Course Not in a Sequence

**Subject**

WELD

**Course #**

100

**Level of Scrutiny**

Content Review

**Upon entering this course, students should be able to:**

Student will demonstrate fundamental knowledge and ability to work safely with electric arc welding equipment; oxyacetylene equipment and welding shop tools.

Welding 100 or 120 or 130. These courses contain a comprehensive Safety lecture component of the welding program. The student is required to pass a written Safety test with 90% accuracy before entering the welding shop.

The student is required to handle gases which are highly explosive and flammable. In addition, they will be dealing with electrical currents, grinding equipment, fire hazards, and high-pressure inert and non-flammable gases. Without proper Safety Training the student would present a very real danger to themselves, fellow students and faculty. The Safety Training required to enter the welding program is identical to the skills needed to function safely in the welding industry and is highly supported by employers and advisory committee members.

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**SECTION D - Course Standards**

**Is this course variable unit?**

No

**Units**

7.00

**Lecture Hours**

90.00

**Lab Hours**

180.00

**Outside of Class Hours**

180

**Total Contact Hours**

270

**Total Student Hours**

450

**Distance Education Approval**

**Is this course offered through Distance Education?**

Yes

**Online Delivery Methods**

DE Modalities	Permanent or Emergency Only?
Hybrid	Emergency Only

**SECTION E - Course Content****Student Learning Outcomes**

Upon satisfactory completion of the course, students will be able to:	
1.	Identify and recognize hazards associated with a welding environment utilizing Oxy-Fuel, SMAW, GMAW, GTAW, PAC, and CAC-A
2.	Apply the use of Personal Protective Equipment (PPE)
3.	Apply common terminology related to safety.
4.	Safely work in a lab setting with many students working together
5.	Explain basic theory of operation of GTAW and GMAW equipment.
6.	Set up SMAW equipment for welding mild steel and stainless steel with a wide variety of electrodes.
7.	Recognize and explain visual defects in an electric arc weld.
8.	Perform SMAW welding in 1G, 2G, 3G and 4G positions in all five joint designs and perform GTAW and GMAW welding in fillet and groove welds.

**Course Objectives**

Upon satisfactory completion of the course, students will be able to:	
1.	Use the tools, machines and equipment of welding in a safe, professional, efficient manner.
2.	Demonstrate improved ability to use and understand the nomenclature of electrodes, gases and other supplies used in the welding discipline.
3.	Demonstrate improved knowledge and ability in welding procedures, processes and techniques.
4.	Demonstrate a high degree of proficiency in setting up and using welding equipment for oxyacetylene, SMAW, GMAW and GTA

**Course Content**

1. BLOCK 1 – Orientation 6 hours
  - a. Review of Safety Practices and Personal Conduct and Responsibilities
2. BLOCK 2 – Cutting Processes 15 hours
  - a. Safety
  - b. Manual Oxyacetylene, Machine Oxyacetylene and Other Gases
  - c. Electric Arc Cutting – Air Arc and Electrode Cutting
  - d. Cutting Nozzles and Gas Pressures
3. BLOCK 3 – Electric Arc Welding with Stick Electrodes 100 hours
  - a. Safety
  - b. Machines and Equipment;
  - c. Starting and Setting Machines (Voltage and Amperage)
  - d. Polarity – Straight and Reverse; Nomenclature of Electrodes and Coatings
  - e. Preparation of Metals for Welding
  - f. Striking and Maintaining the Arc; Running the Basic Beads
  - g. Flat, Vertical and Overhead Welding with Various Electrodes
4. BLOCK 4 – Gas Shielded Arc Welding (GMAW and GTAW) 104 hours
  - a. Safety
  - b. Machines and Equipment
  - c. Shielding Gases
  - d. Filler Metal; Preparation of Materials
  - e. Arc Transfer
  - f. Current: High Frequency, Constant Potential, Variable Potential
5. BLOCK 5 – Related Subjects 15 hours
  - a. Fundamentals of Blueprint Reading; Design of Welded Joints
  - b. Welding Symbols
  - c. Related Mathematics and Fundamental English
  - d. Laws and Codes

6. BLOCK 6 – Materials 15 hours
  - a. Ferrous Materials; Non-ferrous Materials
  - b. Carbon Steel – Alloy Steel; Cast Iron and Cast Steels; Stainless Steel
  - c. Properties of Metals; Kinds of Strength
  - d. Factors related to Properties
  - e. Identification of Metals
  - f. Material shapes, Weights and Uses
  - g. Use of Material Handbooks
7. PREPARING AND FINISHING MATERIALS
  - a. Layout and Fitting
  - b. Cleaning Materials; Handling Materials; Edge Preparation for Welding
  - c. Clean-Up and Painting

## Methods of Instruction

### Methods of Instruction

Types	Examples of learning activities
Lab	

### Instructor-Initiated Online Contact Types

Announcements/Bulletin Boards  
 E-mail Communication  
 Telephone Conversations  
 Video or Teleconferencing

### Student-Initiated Online Contact Types

Discussions

### Course design is accessible

Yes

## Methods of Evaluation

### Methods of Evaluation

Types	Examples of classroom assessments
Exams/Tests	Students will be given written weekly tests covering assigned reading and weekly lectures. Example: tests comprised of multiple choice and T/F questions. Students will be given a mid-term and final examination. Example: Tests comprised of multiple choice, identification, short answer and T/F questions.
Lab Activities	Students will complete weekly lab assignments. Example: place a weld on a V groove butt with an .045 E71T-1 electrode in the 1G position.

## Assignments

### Reading Assignments

1. Students will be required to read selections from their textbook in order to understand essential concepts.  
 Example: section on Gas Tungsten Arc Welding, Althouse, textbook.
2. Students will be required to read selections from their textbook and lecture notes in order to perform lab exercises.  
 Example: place a fillet weld on a T plate with a 1/16th", 2% Ceriated electrode in the 1G position.

### Writing Assignments

1. Students will be required to write-up lab assignments.  
 Example: List three corrective measures that may be taken to prevent or reduce burn through.
2. Students will be required to formulate corrective actions while welding. Example: correctly adjusting machine settings to achieve the proper bead profile.
3. Students will interpret welds to formulate corrective action.

Example: determine possible changes in setting parameters and/or technique to avoid undercut and cold lap.

**Other Assignments**

1. Each student shall research a topic of their choosing, complete a three-page report and give an oral presentation to the class.
2. Each student will design and fabricate a project utilizing a sketch or print, appropriate welding procedures perform a Visual Inspection and critique.

**SECTION F - Textbooks and Instructional Materials**

**Material Type**

Textbook

**Author**

Lincoln Electric

**Title**

Lincoln Electric Procedure Handbook of Arc Welding

**Edition/Version**

13th

**Publisher**

Lincoln Electric

**Year**

1994

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**Material Type**

Textbook

**Author**

Lincoln Electric

**Title**

Metals and How to Weld Them

**Edition/Version**

2nd

**Publisher**

Lincoln Electric

**Year**

1990

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**Material Type**

Textbook

**Author**

Althouse, Turnquist, Bowditch, Bowditch, & Bowditch

**Title**

Modern Welding

**Edition/Version**

10th

**Publisher**

Goodheart-Willcox

**Year**

2004

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**Material Type**

Other required materials/supplies

**Description**

Safety glasses and gauntlet style welding gloves.

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**Proposed General Education/Transfer Agreement****Do you wish to propose this course for a Local General Education Area?**

No

**Do you wish to propose this course for a CSU General Education Area?**

No

**Do you wish to propose this course for a UC Transferable Course Agreement (UC-TCA)?**

No

**Course Codes (Admin Only)****ASSIST Update**

No

**CB00 State ID**

CCC000265460

**CB10 Cooperative Work Experience Status**

N - Is Not Part of a Cooperative Work Experience Education Program

**CB11 Course Classification Status**

Y - Credit Course

**CB13 Special Class Status**

N - The Course is Not an Approved Special Class

**CB23 Funding Agency Category**

Y - Not Applicable (Funding Not Used)

**CB24 Program Course Status**

Program Applicable

**Allow Pass/No Pass**

Yes

**Only Pass/No Pass**

No