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Welding (WELD) 1500 Welding Processes (3 Units) CSU

Advisory: Eligibility for English 1000, Reading 1005 and Mathematics 1050 strongly recommended

Total Hours: 32 hours lecture; 64 hours lab (96 hours total)

Course Description: This introductory course provides an overview of the necessary safety, theory, and practical lab experiences associated with Oxy-Fuel Welding and Cutting, Shielded Metal Arc Welding (SMAW), Gas Metal Arc Welding (GMAW), Flux Core Arc Welding (FCAW), Gas Tungsten Arc Welding (GTAW), and resistance welding processes. The properties and characteristics of metals, basic weld joints, and defects will also be discussed.

Type of Class/Course: Degree Credit

Text: Moniz, B. J., and R. T. Miller. *Welding Skills*. 4<sup>th</sup> ed. Orland Park, Illinois: American Technical Publishers, 2009. Print.

Additional Instructional Materials: None

Course Objectives:

By the end of the course, a successful student will be able to:

1. understand the principles of safe work habits as related to oxy-fuel welding and cutting and the various electric arc welding processes,
2. set up oxy-fuel welding and cutting equipment,
3. braze and solder ferrous and non-ferrous alloys, and
4. apply understanding of the common welding processes, utilizing proper safety and technique (SMAW, GMAW, FCAW and GTAW).

Course Scope and Content:

Unit I Introduction to Common Welding Processes

- A. Overview of Welding
- B. Common Welding Processes

Unit II Safety Related to Oxy-Fuel Welding and Cutting

- A. Requirements of a Safe Welding and Cutting Work Environment
- B. Unsafe Welding and Cutting Conditions
- C. Safety Practices Used in Handling Oxy-Fuel Equipment

D. Set Up and Safety Operation of Electric Arc Welding and Oxy-Fuel Equipment

- Unit III      Operation of Oxy-Fuel Equipment
  - A. Set up of Oxy-Fuel Equipment
  - B. Oxy-Fuel Cutting Techniques
  
- Unit IV      Brazing, Soldering and Silver Soldering
  - A. Correct Technique for Soft Soldering.
  - B. Braze Various Weld Joints
  - C. Silver Soldering
  
- Unit V      Shielded Metal Arc Welding (SMAW)
  - A. Overview and Introduction
  - B. Shielded Metal Arc Welding (SMAW) Equipment
  - C. Shielded Metal Arc Welding (SMAW) Processes and Techniques
  
- Unit VI      Electrical Concepts and Terminology
  - A. Electrical Concepts
  - B. Electrical Terminology
  
- Unit VII      Practical Usage and Application
  - A. Welding Electrodes
  - B. Joint Design
  
- Unit VIII      Gas Metal Arc Welding (GMAW)
  - A. Overview and Introduction
  - B. Basic Gas Metal Arc Welding (GMAW) Equipment
  - C. Gas Metal Arc Welding (GMAW) Processes and Techniques
  - D. Application
  
- Unit IX      Flux Core Arc Welding (FCAW)
  - A. Overview and Introduction
  - B. Flux Core Arc Welding (FCAW) Processes and Techniques
  - C. Application
  
- Unit X      Gas Tungsten Arc Welding (GTAW)
  - A. Overview and Introduction
  - B. Gas Tungsten Arc Welding (GTAW) Processes and Techniques
  - C. Application
  
- Unit XI      Welding Careers and Future Training
  - A. Future Training Opportunities
  - B. Possible Career Options and Types



### Learning Activities Required Outside of Class:

The students in this class will spend a minimum of 6 hours per week outside regular class time doing the following:

1. Assigned readings from the text
2. Completing the necessary assignments

### Methods of Instruction:

1. Lectures
2. Presentations
3. Laboratory practice
4. Class discussions

### Methods of Evaluation:

1. Computational or non-computational problem-solving demonstrations, including:
  - a. exams
  - b. quizzes
2. Skill demonstrations, including:
  - a. practical skill demonstration performance
3. Other examinations, including:
  - a. multiple choice
  - b. true/false items