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Welding (WELD) 1010 Gas Metal Arc Welding (GMAW) and Flux Core Arc Welding (FCAW) (3 Units)

Prerequisite: Successful completion in Welding 1500, Industrial Education Welding 0001, 1001, or 1002 with a grade of “C” or better

Prerequisite knowledge and skills: Before entering the course the student should 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, [Shielded Metal Arc Welding (SMAW), Gas Metal Arc Welding (GMAW), Flux Core Arc Welding (FCAW) and Gas Tungsten Arc Welding (GTAW)], while utilizing proper safety and technique.

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

Course Description: This course will cover the theory and application of the Gas Metal Arc Welding (GMAW) and Flux Core Arc Welding (FCAW) processes. Emphasis will be on safe and proper application of these processes and the practical use of welding principles on mild steel, aluminum, and stainless steel. This course has a material fee.

Type of Class/Course: Degree Credit

Text: Minnick, William H. *Gas Metal Arc Welding Handbook*. 5th ed. Tinley Park, Illinois: The Goodheart-Willcox Company, Inc., 2007. Print.

Minnick, William H. *Flux Cored Arc Welding Handbook*. 3rd ed. Tinley Park, Illinois: The Goodheart-Willcox Company, Inc., 2009. Print.

Althouse, Andrew D., C. H. Turnquist, W. A. Bowditch, and K. E. Bowditch. *Modern Welding*. Tinley Park, Illinois: The Goodheart-Willcox Company, Inc., 2004. Print.

Additional Instructional Materials: None

Course Objectives:

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

1. understand and practice safe work habits related to Gas Metal Arc Welding (GMAW) and Flux Core Arc Welding (FCAW) processes,
2. demonstrate the setup, operation and theory related to Gas Metal Arc Welding (GMAW) and Flux Core Arc Welding (FCAW) processes,

3. use the proper welding process,
4. demonstrate skill and knowledge required to successfully weld mild steel, and
5. understand the various welding codes and tests often associated with the Gas Metal Arc Welding (GMAW) and Flux Core Arc Welding (FCAW) processes.

Course Scope and Content:

- Unit I Welding Safety
- A. Requirements of a Safe Welding and Cutting Work Environment
 - B. Safety Practices Used in Handling Equipment
 - C. Set Up and Safety Operation of Welding Equipment
 - D. Gas Metal Arc Welding (GMAW), Flux Core Arc Welding (FCAW) and Related Safety
- Unit II Gas Metal Arc Welding (GMAW)
- A. Equipment
 - B. Setup and Operation
 - C. Common Welding Processes
- Unit III Flux Core Arc Welding (FCAW)
- A. Equipment,
 - B. Setup and Operation
 - C. Common Welding Processes
- Unit IV Selection
- A. Filler Metal Selection
 - B. Weldability of Metals
 - C. Welding Metallurgy
- Unit V Code Testing Process and Procedures
- A. American Welding Society (AWS) D 1.1 Flux Core Arc Welding (FCAW) Plate Test Overview
 - B. Codes and Standards
 - C. Testing and Inspection of Welds
 - D. Welder Code Testing
 - E. Steel Shapes and Sizes and Associated Metal Weight Chart
- Unit VI Plasma Arc Cutting (PAC) and Demonstration
- A. Overview
 - B. Cutting and Demonstration
- Unit VII Welding Careers and Future Training
- A. Future Training Opportunities
 - B. Possible Career
 - C. 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
3. Preparing for industry code testing

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