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Welding (WELD) 1030 Pipe Welding (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 is designed to provide knowledge and welding skill development related to the requirements of the American Society of Mechanical Engineers (ASME) Section IX and/or the American Petroleum Institute (API) 1104 Welding Codes. Emphasis will be on developing the necessary skill to pass various related code tests. This course has a material fee.

Type of Class/Course: Degree Credit

Text: Rampaul, Hoobasar. *Pipe Welding Procedures*. 2<sup>nd</sup> ed. New York: Industrial Press, 2003. 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 Shielded Metal Arc Welding (SMAW) and the pipe welding trades,
2. demonstrate the setup, operation and theory associated with welding pipe with the Shielded Metal Arc Welding (SMAW) process,
3. understand the various welding codes and test requirements often associated with the Shielded Metal Arc Welding (SMAW) process and the pipe welding trade,
4. use the Shielded Metal Arc Welding (SMAW) process, and

5. develop skills and knowledge required to successfully weld mild steel pipe according a specific pipe code.

Course Scope and Content:

- Unit I            Safety
  - A.     General Safety
  - B.     Shielded Metal Arc Welding (SMAW) and Pipe Welding Safety
  
- Unit II           Shielded Metal Arc Welding (SMAW)
  - A.     Equipment
  - B.     Application Review
  
- Unit III          American Society of Mechanical Engineers (ASME)
  - A.     Section IX Welding Code Overview
  
- Unit IV          American Petroleum Institute (API)
  - A.     API 1104 Welding Code Overview
  
- Unit V           Welding Electrodes (Emphasis E-6010 and E-7018)
  - A.     American Society of Mechanical Engineers (ASME) Section IX Code Test
  - B.     American Petroleum Institute (API) 1104 Code Test
  
- Unit VI          Practical Application of the Techniques
  - A.     American Society of Mechanical Engineers (ASME) Section IX Code Test
  - B.     American Petroleum Institute (API) 1104 Code Test
  
- Unit VII         Oxy-fuel Beveling and Cutting
  - A.     American Society of Mechanical Engineers (ASME) Section IX Code Test
  - B.     American Petroleum Institute (API) 1104 Code Test
  
- Unit VIII        Weld Coupon
  - A.     Removal and Preparation Overview
  
- Unit IX          Common Welding Code Terms
  - A.     American Society of Mechanical Engineers (ASME) Section IX Code Test
  - B.     American Petroleum Institute (API) 1104 Code Test
  
- Unit X           Weld Testing Techniques
  - A.     Destructive
  - B.     Nondestructive
  
- Unit XI          Weld Defect and Discontinuities
  - A.     American Society of Mechanical Engineers (ASME) Section IX Code Test
  - B.     American Petroleum Institute (API) 1104 Code Tests
  
- Unit XII         Common Welding Codes Overview
  - A.     American Welding Society (AWS) D1.1, L.A. City Test
  - B.     American National Standards Institute (ANSI) B31.1



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- Unit XIII American Welding Society (AWS) Certified Welding
  - A. Test Parameters and Protocol
  
- Unit XIV Plate Test
  - A. Test
  
- Unit XV Weld Test
  - A. Coupon Development
  - B. Certified Welding Inspector (CWI) Inspection
  - C. Report development
  
- Unit XVI Professional Development and Future Trends
  - 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
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