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Course Outline for WLDT 69B

ADVANCED PIPE WELDING

Effective: Fall 2008

I. CATALOG DESCRIPTION:
WLDT 69B — ADVANCED PIPE WELDING — 3.00 units

Theory and practical application of pipe joint preparation and design; API (American Petroleum Institute) and AWS (American Welding Society) welding codes specifications for pipe and pipe fittings; geometric curve design for branched join of piping systems; wire and electrodes selections; advanced welding blue print and pipe welding symbols, SMAW, GMAW, and GTAW of pipe joints; metallurgical transformation of weld Heat Affected Area (HAA); welding discontinuities and defects; destructive and non-destructive testing; and methods of inspection and testing.

1.00 Units Lecture 2.00 Units Lab

Prerequisite
WLDT 69A - Beginning Pipe Welding
with a minimum grade of C

Grading Methods:
Letter or P/NP

Discipline:

	MIN
Lecture Hours:	18.00
Lab Hours:	108.00
Total Hours:	126.00

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 4

III. PREREQUISITE AND/OR ADVISORY SKILLS:
Before entering the course a student should be able to:

A. WLDT69A

IV. MEASURABLE OBJECTIVES:
Upon completion of this course, the student should be able to:

A. Identify and understand the API and AWS codes specifications;
B. Interpret blueprint concepts in practical welding applications;
C. Apply and properly joint, fit up and align pipe welding joints;
D. Employ and manually cut pipe joints using plasma, oxy-fuel and gouging equipment in accordance with manufacturing standards;
E. Demonstrate welding of pipe to code specification with proper techniques in non-rotated 5G and 6G position using SMAW, GMAW, and GTAW processes;
F. Identify welding pipe discontinuities and defects;
G. Explain destructive and non-destructive welding test evaluations;
H. Report on welder performance tests in 5G and 6G using one of the three welding processes mentioned above.

V. CONTENT:
A. Welding codes and specifications
    1. API Code
    2. AWS Code
B. Advanced blueprints as used in pipe welding
    1. Welding symbols
    2. Orthographic
    3. Isometric
    4. Piping symbols
    5. Assembly
    6. Details
    7. Weld mapping
C. Welded pipe
    1. Typical joints
    2. Material prep
    3. Fit up

4. Alignment
5. Tack welds
6. Purging

D. Cutting pipe
1. Plasma
2. Oxy-fuel
3. Gouging
4. Saws
5. Machined

E. Weld pipe to code specification with proper techniques
1. 5G fixed
2. 6G fixed
3. SMAW
4. GMAW
5. GTAW

F. Advanced pipe welding inspection
1. Discontinuities
2. Cause
3. Corrective action

G. Advanced welding test evaluation
1. Non destructive testing
2. Destructive testing
3. Hydrostatic testing

H. Welder performance tests
1. 5G fixed
2. 6G fixed

VI. METHODS OF INSTRUCTION:
A. **Lecture** -
B. **Field Trips** -
C. **Demonstration** -
D. Videos

VII. TYPICAL ASSIGNMENTS:
A. Perform pipe weld test in 6G position B. Discuss specific weld defects and discontinuities C. Demonstrate proper repair method of weld defects

VIII. EVALUATION:
A. **Methods**

1. Exams/Tests
2. Quizzes
3. Class Participation
4. Home Work
5. Lab Activities
6. Other:
    a. Methods:
        1. Class participation
        2. Performance of laboratory task list of assignments and projects
        3. Homework assignments
        4. Quizzes
        5. Midterm exam
        6. Final exam
        7. Text

B. **Frequency**

IX. TYPICAL TEXTS:
1. - *Pipe Welding Procedures.* 2nd ed., H. Rampaul, 2003.
2. - *Pipe Trades Pocket Manual*. 6th ed., Thomas Frankland, 2003.

X. OTHER MATERIALS REQUIRED OF STUDENTS:
A. Welding protective clothing
B. Welding gloves
C. Welding goggles
D. Welding helmet
E. Welding safety glasses
F. Welding jacket
G. Welding boots
H. Pure Tungsten
I. 2% Thorium oxide Tungsten