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WLDG 210.01: Pipe Welding - Integrated Lab

Zachary W. Reddig

University of Montana - Missoula, zachary.reddig@umontana.edu

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**THE UNIVERSITY OF MONTANA
MISSOULA COLLEGE
INDUSTRIAL TECHNOLOGY DEPARTMENT**

COURSE SYLLABUS

COURSE NUMBER AND TITLE: WLDG 210 Pipe Welding

DATE REVISED: August 2018

SEMESTER CREDITS: 4

PREREQUISITES: WLDG 180 SMAW, WLDG 117 Blueprint Reading and Welding Symbols;
Corequisite: WLDG 215 Gas Tungsten Arc Welding.

Instructor: Zachary Reddig

E-Mail: Zachary.reddig@umontana.edu

(According to new Federal and UM policies I cannot answer any email that does not come from an official UM email address; no Hotmail, AOL, yahoo, gmail, etc.)

Phone: 243-7644

Office: Welding Lab Office

Office Hours: By appointment or as posted on Faculty office door

RELATIONSHIP TO PROGRAM(S):

Provides theory of fit-up and welding technique with skill development using two welding processes that are primary in the welding of pipe. This experience complements the other welding activities taught in the program to attain a solid, broad based understanding of welding as an industrial metals joining process.

COURSE DESCRIPTION:

Emphasis on skill development in welding of pipe sections to extremely high quality levels as required by national codes and standards. Pipe welding using SMAW E6010 root pass and SMAW E7018 fill and cover. Another setup is for GTAW root pass and SMAW E7018 for the remaining passes in all positions. Visual inspection and destructive testing used to evaluate work according to industry standards.

STUDENT PERFORMANCE OUTCOMES:

Occupational Performance Objectives

Upon completion of this course, the student will be able to:

1. Use E6010 electrodes to weld root pass on 3/8" plate and pipe that meets visual and destructive testing as provided in **American Welding Society (AWS), D1.1 Structural Welding Code-Steel.**
2. Use E7018 electrodes weld fill and cover passes on 3/8" plate and pipe that meet visual and destructive testing as provided in **American Welding Society (AWS), D1.1 Structural Welding Code-Steel.**
3. Demonstrate correct preparation and fit-up of pipe sections using specifications provided in **American Welding Society (AWS), D1.1 Structural Welding Code-Steel.**
4. Demonstrate an understanding of the technical knowledge related to successful welding of pipe to a code or standard by scoring a 70% or better on a written exam covering this material.
5. Demonstrate the successful welding of 5" or 6" schedule 80 pipe in the 2G position (pipe axis

is vertical, the 5G position (pipe axis is horizontal, and the 6G position (pipe axis is at a 45° angle) using a E6010 root and E7018 fill/cover passes.

6. Demonstrate the successful welding of 3" or 4" schedule 80 pipe in the 2G position (pipe axis is vertical, the 5G position (pipe axis is horizontal) and the 6G position (pipe axis is at a 45° angle) using a GTAW root and E7018 fill/cover passes.

7. Students will be able to successfully execute and pass a 5G pipe certification test to AWS D1.1 Structural Welding Code-Steel with E6010 root and E7018 fill and cover pass. (Added 08/11/2016)

STUDENT PERFORMANCE ASSESSMENT METHODS AND GRADING PROCEDURES:

Grading Scale:

A= 100%- 90%

B= 89%- 80%

C= 79%- 70%

D= 69%- 60%

F= 59%- 0%

NOTE: Courses must be passed with a 'C minus (C-)' or greater to count toward degree/certificate requirements.

Grading Breakdown:

Lab Work	40%
Exams	30%
Quizzes	10%
Notebook	5%
Professionalism	15%

Practical Welding Tests: Hands-on welding tests based on lab assignments. Upon successful completion of lab assignments a hands on welding test derived from written specifications and graphics (drawings) will be administered. It will be graded based upon execution ie. fit-up, weld profile, workmanship, etc. as prescribed by AWS, ASME Section 9, and API codes, standards, and the instructions given at the time of the test.

Written Exams: Exams based on class lectures, reading assignments given in class, homework, notes from class video presentations, etc. **No make-up exams will be allowed.**

Quizzes: Short impromptu tests given on reading assignments, demonstrations, lectures. Composed of student name/date and three questions. Name and date are worth 25%. Each question is worth 25%. To receive credit for questions the question must be written out and answered correctly. Quizzes may be given at anytime during the course scheduled meeting time. **No make-up quizzes will be allowed.**

Notebook: Compilation of class notes and handouts. To receive the full 5% credit, the notebook must be neat and organized. It must also be contained or be found contiguous within a three ring binder.

Professionalism: Defined as a combination of attitude, motivation, participation, organization and work area cleanliness as demonstrated on a daily basis in the lab and classroom. There is mandatory class attendance expected in this class, such as place of employment. There are circumstances beyond your control but communication is needed. If you cannot make class contact is expected from the student by email or phone call. Letting a cohort know that you

cannot make it to class doesn't count.

POLICIES:

- **Safety is required to be practiced at all times. Disregarding safety practices, endangering yourself or others may result in your being denied access to the lab areas.**
- **Eye protection is mandatory at all times in the lab area.**
- **Noise cancelling headphones and earbuds are forbidden to be used in the lab shop area. This also goes for music, the shop is loud enough. If ear protection is needed they need to be ANSI safety rated earplugs. These can be provided or you can have your own.**
- **“Make up” exams or quizzes are not given for any reason**
- **Assignments will be docked 10% for each day it is turned in late after the due date.**
- **Cell phones are to be turned off during class time: no texting, calculations, or calls are to be done during class time.**
- **Any forms of cheating during exams or quizzes are an automatic 0.**
- **Students are expected and required to learn how access and navigate Moodle by the end of first week of instruction. These function as supplements to the course.**
- **Attendance is taken, you are required to be in attendance to successfully complete the course.**

REQUIRED TEXTBOOKS:

Welding Principles and Practices, 4th Edition; Sachs and Bohnart, McGraw Hill.

Shielded Metal Pipe Welding- Uphill: Author: Hobart School of Welding Tech.; Publisher: Hobart School of Welding Tech.

SUGGESTED REFERENCE MATERIALS:

The Welding Journal, published monthly by the American Welding Society

REQUIRED SUPPLIES:

1. Welding Helmet with #10 or #11 lens
2. Welding Gloves
3. Eye Protection
4. Pliers with wire-cutting capabilities
5. Full size “pipe” hand brush (has tapered grouping of bristles)
6. 4” or 4 1/2” right angle handheld grinder
7. Tape Measure
8. Striker
9. Upper body protection, leathers, coveralls or equivalent
10. Lock for locker

ACADEMIC INTEGRITY: All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. The Code is available for review online at <http://www.umt.edu/SA/VPSA/index.cfm/page/1321>.

DISABILITY ACCOMMODATION: Eligible students with disabilities will receive appropriate accommodations in this course when requested in a timely way. Please contact me after class or in my office. Please be prepared to provide a letter from your DSS Coordinator. For more information, visit the Disability Services website at <http://www.umt.edu/dss/> or call 406.243.2243

(Voice/Text).

COURSE OUTLINE:

1. Typical fit-up for welded pipe
2. Welding codes as they apply to welded pipe
3. SMAW of welded pipe—technique
4. GTAW of welded pipe—technique
5. Techniques used to evaluate welded pipe
 - a. Visual inspection
 - b. Destructive testing
 - c. Non-destructive evaluation
6. Practical welding experience of pipe.
 - a. Plate
 - b. Pipe 2G, E6010 root, E7018 fill/cover
 - c. Pipe 5G, E6010 root, E7018 fill/cover
 - d. Pipe 6G, E6010 root, E7018 fill/cover
 - e. Pipe 2G, GTAW root, E7018 fill/cover
 - f. Pipe 5G, GTAW root, E7018 fill/cover
- 7. Students will be able to take and pass a welding qualification test as to code procedure set from American Welding Society –D1.1 Structural Welding Code-Steel. This test will certify them to a determined process on carbon steel from prequalified variables. (08/11/2016)**

All students have a chance to be certified to a 5G pipe certification test to AWS D1.1 Structural Welding Code-Steel with E6010 root and E7018 fill and cover pass. (Added 08/11/2016)

NOTE: Faculty reserves the right to modify syllabi and assignments as needed based on faculty, student, and/or environmental circumstances.