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WLDG 215.01: GTAW (integrated lab)

Bradley A. Platts

University of Montana, Missoula

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

COURSE SYLLABUS

COURSE NUMBER AND TITLE: WLDG 215 GTAW Welding

DATE REVISED: August 2018

SEMESTER CREDITS: 4

PREREQUISITES: None

Instructor: Brad Platts

E-Mail: bradley.platts@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: 243-7647

Office: Welding Lab Office

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

RELATIONSHIP TO PROGRAM(S):

Provides theory of, operation and skill development with a welding process that is primary in the welding of aluminum and stainless steel. This experience complements the other welding processes taught in the program to attain a solid, broad based understanding of welding as an industrial metals joining process.

COURSE DESCRIPTION:

The theory and safe operation of Gas Tungsten Arc Welding (GTAW). Examination of power source controls and operation along with associated consumables such as gases, electrode filler materials for carbon steel, stainless steel, and aluminum. Welding skill development according to industry standards using these materials in the flat, horizontal, and vertical positions.

STUDENT PERFORMANCE OUTCOMES:

Occupational Performance Objectives

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

1. Complete a safety test covering GTAW safe operation with a score of 70% or better.
2. Identify and describe fully each control on an industrial rated/type GTAW power source.
3. Demonstrate the proper assembly of a GTAW torch and related equipment.
4. Demonstrate machine set-up for the successful welding of aluminum, stainless steel and carbon steel.
5. Demonstrate fillet and groove welding of aluminum, stainless steel, carbon steel and identify deficiency based to American Welding Society standards
6. Inspect fillet and groove welds on aluminum, stainless steel, carbon steel and identify deficiency based upon American Welding Society standards.
7. Use technical terminology as it relates to welding based upon American Welding Society terms and definitions.
8. Complete written exams given, covering the theory of operation of GTAW with cumulative scores of 70% or better.

9. Complete practical welding exams given covering the welding of aluminum, stainless steel, and carbon steel using fillet and groove welds in the flat, horizontal and vertical positions based upon acceptable standards given by AWS.

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	25%
Quizzes	10%
Notebook	5%
Professionalism	20%

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 i.e. fitup, weld profile, workmanship, etc. as prescribed by AWS 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. 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.

POLICIES:

- **DO NOT OPERATE ANY EQUIPMENT YOU HAVE NOT BEEN TRAINED ON**
- **NO WRITING OR STICKERS OF ANY KIND ON SCHOOL PROPERTY**
- **THE ONLY MARKING ON WORKPIECES SHOULD BE FOR IDENTIFICATION OR INSTRUCTIONAL PURPOSES**
- **NO EARPHONES, HEADPHONES, OR OTHER SOURCE OF MUSIC**
- **DO NOT PUT GARBAGE IN METAL SHAVING BINS IN MACHINING AREA**
- **ANY TOOLS USED MUST BE PUT AWAY AT THE END OF EACH CLASS PERIOD**

- 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.
- “Make up” exams or quizzes are not given for any reason
- Assignment grades will be deducted 10% for each day after the due date.
- Assignments more than three days late will not be accepted
- Late assignments must be turned into a special file in the teacher’s office
- 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 to 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:

Miller Welding Process Training Series, Gas Tungsten Arc Welding

SUGGESTED REFERENCE MATERIALS:

Welding Principles and Practices

REQUIRED SUPPLIES:

1. Welding Helmet with #10 or #11 lens
2. TIG welding gloves
3. Eye Protection
4. Pliers with wire-cutting capabilities
5. Stainless steel wire hand brush (toothbrush size)
6. 4” or 4 1/2” right angle handheld grinder
7. Tape Measure
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. Gas tungsten arc welding process
 - a. Advantages of the process
 - b. Disadvantages of the process
2. GTAW fundamentals
 - a. AC/DC electricity
 - b. The high frequency arc

- c. Balanced wave forms
3. GTAW equipment
 - a. Constant current power source
 - b. Engine driven power source
 - c. Inverter power source
 - d. Remote control devices
 - e. GTAW torches
 - f. Torch components
4. Set-up for welding
 - a. Set-up of the power source
 - b. Set-up of the torch
5. Techniques for welding
 - a. Flat position
 - b. Out of position
6. Shielding Gases for GTAW
7. Electrodes for GTAW
8. Filler Metals for GTAW
 - a. Practical welding experience of carbon steel, aluminum, and stainless steel. Also including groove and fillet welds to industry standards as per American Welding Society
9. Cost considerations.
10. Back Purge

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