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| **Weld 215**  **Intermediate Arc Welding/SMAW, GMAW**  **COURSE SYLLABUS** | | |
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| Instructor: | Martin Wolfe | Term: | Fall 2014 | |
| Office: | T145 | Class Meeting Days: | Tuesday | |
| Phone: | 708-709-7807 | Class Meeting Hours: | 8:00am–12:40pm | |
| E-Mail: | mwolfe@prairiestate.edu | Class Location: | T186 | |
| Website: | [www.prairiestate.edu](http://www.prairiestate.edu) | Lab Location: | T165 Welding lab | |
| Office Hours: | Tues, Wed, Thurs, 1-5pm |  |  | |
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# Welcome!

Thank you for taking the time to enroll in the program as it will be one of the most rewarding processes that you will go through. I look forward to an exciting semester which will challenge you and be a lot of fun at the same time.

# Course Overview

# Intermediate gas metal arc welding and shielded metal arc welding techniques are taught. Topics include metal transfer, types of equipment and supplies, equipment set-up, and troubleshooting. This course is designed to develop an understanding of and manipulative skills needed with gas metal arc welding (GMAW/SMAW) equipment. Topics include GMAW/SMAW equipment, MIG, special welding processes, mechanical testing of welds in flat, horizontal and vertical positions (GMAW).

# Course Prerequisites

None

# Course Credits

3 credit hours

# Required Texts and Materials

Text: Welding, principles and applications; Jeffus, Larry

# Expected competencies/outcomes

At the completion of this course, the students will, given the appropriate special tools and equipment, be able to safely perform the attached list of tasks with a degree of proficiency and in a period of time deemed satisfactory by the instructor.

# Disability Access:

Prairie State College is committed to providing reasonable accommodations for all persons with disabilities. This syllabus is available in alternate formats upon request. Students who need accommodations must be registered with Student Disability Services,

**Attendance Policy**: Attendance is expected and records will be maintained. Consistent attendance is essential for success in this course. Tardiness and leaving class/lab early will also be noted. People entering the classroom late should take the instructor and students into consideration. Poor attendance not only denies the individual student instruction but also denies the class of the unique perspective of that student. For these reasons, on the third absence, the final letter grade will be lowered one full letter grade. Each additional two absences will lower your final grade an additional letter.

**Professionalism Policy**:

Per college policy and classroom etiquette; mobile phones, iPods, *etc*. **must be silenced** during all classroom and lab lectures. Those not heeding this rule will be asked to leave the classroom/lab immediately so as to not disrupt the learning environment. Please arrive on time for all class meetings. Students who habitually disturb the class by talking, arriving late, *etc*., and have been warned may suffer a reduction in their final class grade.

**Academic Conduct Policy**:

Academic dishonesty in any form will not be tolerated. If you are uncertain as to what constitutes academic dishonesty. As in all College courses, The student handbook Rules of Conduct will be applied. Violations of these rules will result in a record of the infraction being placed in your file and receiving a zero on the work in question AT A MINIMUM. At the instructor’s discretion, you may also receive a failing grade for the course. Confirmation of such incidents can also result in expulsion from the College

**Methods of Evaluation:**

The norm expected in the workplace is “Excellence”. The same is expected of your work in this course.

Grading criteria:

Quizzes 15% Excellent performance (your best) earns you an A

Homework 10% Good performance (moderate effort) earns you a B

Midterm Exam 15% Mediocre performance (little effort) earns you a C

Final Exam 20% Poor performance (minimum effort) earns you a D

Attendance/Classroom 10%

Participation

Shop/Lab 30%

**Course Goals/Objectives**

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

1. Describe uses, processes, and occupational opportunities for arc welding.
2. Describe and demonstrate safety procedures using the arc welding process.
3. Demonstrate basic and intermediate arc welding techniques.
4. Demonstrate equipment used in the oxyacetylene flame cutting process.
5. Define arc welding terms.
6. Describe types of weld joints, preparation, and dimensions.
7. Describe effects of welding costs: root opening, bevel angle, and reinforcement.
8. Describe and demonstrate all position welding with E6010 and E7018 electrodes.
9. Describe the different types of arc welding currents and the use of temperatures.
10. Describe the generator, transformer/rectifier, and transformer power sources.
11. Describe and demonstrate the air carbon arc cutting process.
12. Describe electrode types, coatings, sizes, metal transfers, and American Welding Society (A.W.S.) electrode classifications.
13. Describe and demonstrate hard facing techniques, preparation, and electrode selection.
14. Describe identification methods on ferrous and non-ferrous metals, steel alloys, and steel numbering system.

**Detailed topical course outline:**

1. Introduction to Arc Welding **Chapter 1**
   1. Welding defined
   2. Uses of welding
   3. Welding processes
   4. Occupational opportunities in welding
   5. Training for welding occupations
2. Safety in Arc Welding **Chapter 2**
   1. Burns
   2. Eye and ear protection
   3. Respiratory protection
   4. Ventilation
   5. Electrical safety
   6. General work clothing
   7. Cylinder safety
   8. Fire protection
   9. Work area
   10. Hand and power tools
3. Basic and Intermediate Arc Welding Techniques **Chapter 3**
   1. Striking the arc
   2. Effect of too high or too low current setting
   3. Electrode size and current setting
   4. Arc length
   5. Electrode angle
   6. Electrode travel
   7. Stringer beads
   8. Weld bead placement
4. Oxyacetylene Flame Cutting **Chapter 8**
   1. Safety in cutting
   2. Pressure regulators
   3. Cylinder valves
   4. Cutting torches **Chapter 27**
   5. Cutting tips
   6. Check valves
   7. Hoses and fittings
   8. Flashbacks and backfires **Chapter 4**
   9. Types of flames
   10. Leak detection
   11. Manifold systems
   12. Cutting techniques
5. Arc Welding Terminology **Chapter 5**
   1. Arc welding terms
   2. Arc welding definitions
6. Welding Joint Design **Chapter 6**
   1. Forces on a weld
   2. Types of weld joints
   3. Weld joint design
   4. Edge preparation
   5. Joint dimensions
7. Welding Costs **Chapter 9**
   1. Minimum root opening
   2. Minimum bevel angle
   3. Minimum reinforcement
8. Out of Position Arc Welding **Chapter 10**
   1. Vertical position welding, all joints with E6010, E7018 electrodes
   2. Overhead position welding, all joint with E6010, E7018 electrodes
   3. Horizontal position welding, butt joint, with E6010, E7018 electrodes
9. Electric Currents for Arc Welding **Chapter11**
   1. Electric currents
   2. Arc temperature
   3. Direct current **Chapter 12**
   4. Alternating current
   5. Polarities
10. Welding Power Sources
    1. Generator power source
    2. Transformer/rectifier power source
    3. Transformer power source
11. Air Carbon Arc Cutting
    1. Carbon arc cutting safety

II. Gas Metal Arc Welding Equipment **Chapter 13**

A. Power sources

B. Wire Feeders

C. Shielding Gasses

III. Metal Transfer

A. Short Circuit **Chapter 14**

B. Spray Arc

C. Globular

D. Pulsed Spray

IV. Troubleshooting