

# Dakota County Technical College

## WELD 1210: Welding Safety and Theory II

### A. COURSE DESCRIPTION

Credits: 3

Lecture Hours/Week: 3

Lab Hours/Week: \*.\*

OJT Hours/Week: \*.\*

Prerequisites: None

Corequisites: None

MnTC Goals: None

Upon proper instruction the student will have an understanding of metallurgy as it pertains to base metal and its alloying elements. The student will have an understanding of safety practices associated within the welding industry. Upon proper instruction the student will have knowledge of advanced welding processes and cutting technology. Students will interpret code specifications with testing and inspection gauges. Prerequisites: Welding Safety and Theory I

**B. COURSE EFFECTIVE DATES:** 08/27/2012 - Present

**C. OUTLINE OF MAJOR CONTENT AREAS**

## **D. LEARNING OUTCOMES (General)**

1. Review of basic safety for the welding trade
2. List Lock-out/tag-out procedures
3. Understand basic confined space entry and regulations
4. Complete an industry hot-work permits
5. List container cleaning procedures
6. Understand ladder safety
7. List fall arrest equipment types
8. Understand over-head hoist operation
9. Understand basic forklift operation
10. Theory of out vertical and overhead welding
11. Theory of Carbon Arc Gouging
12. Theory of Plasma Arc Gouging
13. Theory of Oxy-Fuel Gouging
14. Machine settings for Pulsed GTAW and GMAW
15. Metallurgical properties of common metals
16. Metallurgical properties of common metals
17. List physical properties of metals.
18. List mechanical properties of metals.
19. Define strength.
20. Define tensile strength, and the units used to measure it.
21. Define ductility, and the units used to measure it.
22. Define hardness, and the units used to measure it.
23. Define steel.
24. Define cast iron.
25. Understand the effects of carbon content on steel.
26. List the common alloys and their properties.
27. Interpret the SAE classification system for steel.
28. Interpret the AISI classification system for stainless steel.
29. Interpret the AA classification system for aluminum.
30. List the properties and uses of cast iron.
31. List common uses for the most common metals.
32. List basic methods for identifying metals.
33. Define and describe hardening of steel.
34. Define and describe heat treating and annealing of steel.
35. List harmful effects of welding heat.
36. Define heat affected zone (HAZ).
37. List and briefly describe the important metallurgical structures in steel.
38. Define weldability.
39. Explain the purpose of preheating.
40. Describe the problems caused by hydrogen in steel.
41. Describe the problems caused by hydrogen in aluminum.
42. Define carbide precipitation.
43. Describe proper high strength steel welding procedures.
44. Describe proper stainless steel welding procedures.

45. Describe proper aluminum welding procedures.
46. Describe proper cast iron welding/repair procedures.
47. Compare the metallurgical effects of different welding processes.
48. Explain the importance of correctly matching filler metal to base metal.
49. List national codes that govern welding
50. Define a procedure qualification record.
51. Define a weld procedure specification.
52. Define a welding qualification record.
53. List methods of NDT inspection.
54. Define radiographic inspection.
55. Define ultra-sonic inspection.
56. List types of process/training for Stainless Steel Welds.
57. Define Welder Qualification Test.
58. Define Welder Certifications.
59. Explain ¿Code Type Welding.¿
60. List destructive testing methods

**E. Minnesota Transfer Curriculum Goal Area(s) and Competencies**

None

**F. LEARNER OUTCOMES ASSESSMENT**

As noted on course syllabus

**G. SPECIAL INFORMATION**

None noted