

# Dakota County Technical College

## WELD 1101: Welding Safety and Theory I

### A. COURSE DESCRIPTION

Credits: 3

Lecture Hours/Week: 3

Lab Hours/Week: \*.\*

OJT Hours/Week: \*.\*

Prerequisites: None

Corequisites: None

MnTC Goals: None

This course will give the student a basic introduction to welding and cover basic safety for the welding trade. Theory for Shielded Metal, Gas Metal, Flux Cored, and Gas Tungsten Arc Welding Processes. Theory for Oxygen Fuel, Plasma Arc, and Carbon Arc Cutting/Gouging processes. Also covered is visual inspection and quality standards. Prerequisites: None

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

**C. OUTLINE OF MAJOR CONTENT AREAS**

**D. LEARNING OUTCOMES (General)**

1. Introduction to the welding trade and processes
2. Basic safety for the welding trade
3. Understand importance of the proper safety attitude
4. List regulatory agency safety codes and standards.
5. List personal protective gear available.
6. List concepts related to hearing safety.
7. List concepts related to material handling safety.
8. List concepts related to arc welding safety.
9. List concepts related to cutting safety
10. List concepts related to eye safety.
11. List concepts related to fire safety.
12. Understand electrical safety concepts.
13. Understand ultraviolet radiation hazards.
14. Identify and list flammable materials.
15. Understand hot metal hazards.
16. Understand hot slag hazards.
17. Identify hazardous metal coatings.
18. Understand equipment and adjustment.
19. Understand compressed gas cylinder safe handling technology.
20. Be able to define: Welding.
21. List the four main types of welding positions within the industry.
22. Identify five basic product joint designs.
23. Understand fillet weld measuring.
24. Define Voltage.
25. Understand polarity theory
26. Define Amperage.
27. Understand machine output/input ratings.
28. Identify components of welding equipment per process.
29. Understand basic welding equipment maintenance
30. Identify electrode types per process
31. Understand AWS electrode number system per process
32. Understand electrode diameter selection per process
33. Understand electrode coatings/elements per process
34. Understand proper electrode storage
35. List amperage control/effect per weld process
36. List voltage control/effect per weld process
37. List amperage control/effect per weld process
38. List work angle control/effect per weld process
39. List travel control/effect per weld process
40. List filler addition-manipulation control/effect per weld process
41. List shielding gas control/effect per weld process
42. List advantages and disadvantages of each process
43. Explain type of power supply used for each process
44. Explain type of welding current used for each process

45. Define GMAW, MIG, and MAG
46. Understand the principles of GMAW operation.
47. Identify and define the four GMAW transfer modes.
48. List advantages/disadvantages of the metal transfers
49. Define GTAW and TIG
50. Understand the principles of GTAW operation.
51. Explain the advantages and uses of DCEP current.
52. Explain the advantages and uses of DCEN current.
53. Explain the purpose(s) of high-frequency addition to welding current.
54. Explain the functions of post-flow.
55. Describe proper tungsten electrode preparation for DC welding.
56. Identify GTAW machine controls.
57. List machine settings for GTAW welding on steel.
58. Describe the effects of incorrect arc length.
59. Describe the effects of electrode contamination.
60. Define SMAW
61. Understand the principles of SMAW operation.
62. Define arc blow and corrections for it
63. Define FCAW
64. Understand the principles of FCAW operation
65. Identify and define the FCAW transfer modes.
66. Identify cutting equipment components per process.
67. Understand characteristics cutting processes
68. Understand theory of operation for manually cutting steel.
69. List equipment for various thickness ranges.

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

None

**F. LEARNER OUTCOMES ASSESSMENT**

As noted on course syllabus

**G. SPECIAL INFORMATION**

None noted