

# WELDING TECHNOLOGY (WELD)

## WELD 0004. Welding Operator Orientation

*Units: 0.5*

Prerequisite: Completion of WELD 0020 and 0040 with grades of "C" or better

Hours: 9 lecture

Orientation course to prepare students for enrollment in WELD 0084. A required component of the Department of Labor American Apprenticeship Initiative. Restricted enrollment based on apprenticeship eligibility requirements. (pass/no pass grading) (not transferable)

## WELD 0010. Exploring Metals/Introduction to Gas Welding

*Units: 2*

Hours: 72 (18 lecture, 54 laboratory)

History and development of joining metals, metalworking, and welding methods. Modern welding and fabrication techniques. Proper and safe use of modern metal fabrication equipment and hands-on experience with Oxy-Acetylene (Gas) welding based on an assigned student project. (CSU)

## WELD 0015. Introductory Welding for Metalworking

*Units: 2*

Advisory: Completion with grade of "C" or better or concurrent enrollment in WELD 10

Hours: 72 (18 lecture, 54 laboratory)

Focuses on the three common metal working processes of Stick, MIG, and TIG welding, including correct setup and "how to" techniques. Plasma arc cutting and Oxy-fuel cutting processes also covered. Designed for both students interested in the metal art field as a companion to ART 22, and for students wishing to pursue a career in welding by continuing on to WELD 20. (CSU)

## WELD 0020. Introduction to Welding Technology - Career Path

*Units: 3*

Advisory: Completion of WELD 10 or 15 with grade of "C" or better, or previous welding experience

Hours: 90 (36 lecture, 54 laboratory)

Theory, techniques and practice in position welding of Shielded Metal Arc, Gas Metal Arc, and Oxyacetylene welding. Plasma and Flame Cutting are also employed. Intended as a foundation welding technology course for students on the welding career path. (not transferable)

## WELD 0025. Intermediate Welding Technology - Career Path

*Units: 3*

Prerequisite: Completion with grade of "C" or better, or concurrent enrollment in WELD 20

Hours: 90 (36 lecture, 54 laboratory)

Emphasis on position welding techniques in Shielded Metal Arc (SMAW) and Oxy-Acetylene welding (OAW). Flux Core Arc (FCAW), Oxy-fuel flame Cutting (OFC) and Air Carbon Arc Cutting (CAC-C) are also performed. Intended as an intermediate level welding course for students following a career path in the welding field. Students who have taken WELD 30 are advised not to enroll in WELD 25. (not transferable)

## WELD 0028. Independent Study

*Units: 1-3*

Designed for students interested in furthering their knowledge at an independent study level in an area where no specific curriculum offering is currently available. Independent study might include, but is not limited to, research papers, special subject area projects, and research projects. See Independent Study page in catalog. (CSU)

## WELD 0030. Advanced Shielded Metal Arc Welding of Structural Plate and Pipe

*Units: 3*

Prerequisite: Completion of WELD 20 with grade of "C" or better

Advisory: Completion with grade of "C" or better or concurrent enrollment in WELD 25

Hours: 90 (36 lecture, 54 laboratory)

Advanced course on welding of structural plate and pipe using accepted practices of industry with Shielded Metal Arc (Stick) Process. Emphasis on the welding techniques used for out-of-position welding (3G-4G plate and 5G-6G pipe full penetration welds). (CSU)

## WELD 0040. Wire Feed Welding Processes - Career Path

*Units: 2*

Prerequisite: Completion of WELD 10 or 15 with grade of "C" or better

Advisory: Completion of WELD 20 with grade of "C" or better

Hours: 72 (18 lecture, 54 laboratory)

Gas Metal Arc and Flux Core Welding processes. Explores the various modes of metal transfer when using the Gas Metal Arc Welding process. In Flux Cored Arc Welding, both Self Shielding and Dual Shielding, are covered. (not transferable)

## WELD 0050. Gas Tungsten Arc Welding (TIG) - Career Path

*Units: 3*

Prerequisite: Completion of WELD 20 with grade of "C" or better

Advisory: Completion of WELD 15 with grade of "C" or better

Hours: 90 (36 lecture, 54 laboratory)

Tungsten Inert Gas Welding methods and techniques used to weld carbon steel, stainless, aluminum, and alloy steels. Instruction in equipment setup for different metals, filler selection, material identification, and welding techniques using Gas Tungsten Arc. Laboratory exercises include multiple positions of fillet and groove welds using carbon steel, stainless steel and aluminum of different thicknesses. (CSU)

## WELD 0060. Welding Metallurgy

*Units: 3*

Prerequisite: Completion of WELD 30 or 50 with grade of "C" or better

Advisory: Completion of CHEM A with grade of "C" or better

Hours: 90 (36 lecture, 54 laboratory)

Exploration of the production and properties of ferrous metals used in the welding industry. The chemical and physical properties of metals, crystallization, and theoretical concepts of alloying. Laboratory experiments in metal identification, hardness and destructive testing, heat treating, sample preparation, and microphotography. (CSU)

## WELD 0066. CNC Mill 3D Manufacturing

*Units: 3*

Advisory: Completion of WELD 74 with grade of "C" or better

Hours: 90 (36 lecture, 54 laboratory)

Principles and operative skills to setup, program, and operate Computer Numerical Control (CNC) milling machinery, with a focus on building the skills to work as a setup operator. Instruction includes an overview of the machining process, quality control, metrology, inspection, blueprint reading, Computer-Aided Manufacturing (CAM), beginning CNC operations and manual programming skills. (not transferable)

**WELD 0070. Principles of Fabrication**

*Units: 2.5*

Prerequisite: Completion of WELD 20 with grade of "C" or better  
Advisory: Completion of WELD 30 with grade of "C" or better; OR completion of WELD 25 and WELD 40 with grades of "C" or better  
Hours: 99 (18 lecture, 81 laboratory)

Foundation fabrication course includes elements of design and fabrication methods, tool and equipment utilization, materials planning, and print reading. Designed for welding students wanting to learn the foundation skills of steel fabrication and construction process. (not transferable)

**WELD 0074. Computer-Aided Metal Cutting Design**

*Units: 3*

Prerequisite: Completion of WELD 15 or 20 with grade of "C" or better  
Hours: 90 (36 lecture, 54 laboratory)

Study of Computer Numerically Controlled (CNC) cutting systems using industry standard hardware and development software. Topics include design principles, copyright, selection of materials appropriate for each cutting method, billing of materials and job estimating, comparison of plasma, water-jet, and laser cutting operations and methods, basic G and M code commands, use of consumables, cut quality evaluation, and trouble-shooting techniques. (not transferable)

**WELD 0076. Ornamental Iron Fabrication I**

*Units: 2*

Hours: 72 ( 18 lecture, 54 lab)

Metalworking methods and techniques used in the early industrialization to include introduction to blacksmith training. Basic traditional forging processes and techniques, applicable to ornamental metalwork fabrication, including forge welding, tool making, and basic joinery. (not transferable)

**WELD 0080. Structural Steel Welding Certification**

*Unit: 1*

Prerequisite: Completion of WELD 30 and 40 with grades of "C" or better  
Advisory: Students must be competent in vertical and overhead position welding using certification welding processes of SMAW, FCAW-G and FCAW-S

Hours: 42 (6 lecture, 36 laboratory)

Designed to certify the welder within the guidelines of American Welding Society (AWS) Structural Steel Code D1.1. Focus on manipulative skill development with SMAW E-7018 in 4G and 3G, FCAW-G in 3G and FCAW-S in 3G and 4G in preparation for the actual certification test. (not transferable)

**WELD 0082. Pipe Welding Certification - Uphill**

*Unit: 1.5*

Prerequisite: Completion of WELD 30 and 40 with grades of "C" or better; concurrent enrollment in or completion of WELD 80 with grade of "C" or better

Advisory: Students must be competent in horizontal, vertical and overhead position welding with open root groove joints using the welding processes of SMAW; if GTAW root pass certification is the goal, WELD 50 skill set competency for GTAW is also needed

Hours: 54 (14 lecture, 40 laboratory)

Designed to certify the welder within the guidelines of Section IX of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, or the American Petroleum Institute (API) Standard 1104 Welding of Pipelines and Related Facilities. Focus on manipulative skill development using SMAW, GTAW and GMAW processes in preparation for the actual certification test. (CSU)

**WELD 0083. Pipe Welding Certification - Downhill**

*Units: 0.5*

Prerequisite: Completion with grade of "C" or better or concurrent enrollment in WELD 82

Advisory: Student must be competent in SMAW pipe welding with E-6010 electrode in position

Hours: 36 (5 lecture, 31 laboratory)

Downhill pipe welding to prepare to certify within the guidelines of American Petroleum Institute - welding of cross-country pipelines. Focus on manipulative skill development in preparation for certification test using downhill techniques. (not transferable)

**WELD 0084. Welder Operator Certification**

*Units: 0.5*

Prerequisite: Completion of WELD 0004 with passing grade

Hours: 16 (6 lecture, 10 laboratory)

Certification of welding operator to ISO standards. Requires use of mechanized welding equipment. Part of the WELD CONNECTION Apprenticeship. (not transferable)

**WELD 0095. Internship in Welding Technology**

*Units: 0.5-4*

Designed for advanced students to work in an area related to their educational or occupational goal. Provides new on-the-job technical training under the direction of a worksite supervisor, allowing students to expand knowledge and skills in the chosen field. Mandatory orientation session and faculty approval to determine eligibility. Students may earn up to a total of 16 units in internship courses (any course numbered 95 and PDEV 94). (CSU-with unit limitation)