

Welding

The following matrix indicates those courses deemed transferable among institutions listed across the top of the matrix. The numbers on the matrix represent the number of semester hours associated with the course at each institution and which institutions have agreed to transfer the commonly numbered course in each row.

A list of the academic discipline liaisons contacts for each institution are listed at the bottom of this document.

Prefix	Number	Course Title	BSC	LRSC	NDSCS	WSC	NHSC
MFGT	120	Basic Welding I			1		
MFGT	121	Basic Welding II			1		
WELD	100	Orientation & Safety		3			
WELD	101	OA Welding, Brazing, Cutting	2	3			
WELD	102	Testing OA in Welding/Brazing		3-4			
WELD	103	GMA & FCA Welding		3			
WELD	104	SMA Welding I		3			
WELD	105	SMA Welding II		3			
WELD	106	GTA & PA Welding		3			
WELD	108	Symbols for Welding Blueprints		3			
WELD	109	Blueprint Reading and Welding Symbols				3	
WELD	151	Welding Theory I			3	3	4
WELD	152	Welding Theory II			3		
WELD	153	Welding Lab I			5	6	6
WELD	154	Welding Lab II			5		
WELD	201	Welding Theory III			4		
WELD	202	Welding Theory IV			4		
WELD	211	Welding Lab III			7		
WELD	212	Pipe/Plate Welding			7		
WELD	213	Fabrication Welding			7		

MFGT 120 Basic Welding I

Basic training in Oxy-Acetylene Welding (OAW) and Cutting, Shielded Metal Arc Welding (SMAW), and Gas Metal Arc Welding (GMAW). Equipment, safety, and the common joints are covered. Lecture and shop instruction stress the application of welding techniques and processes used to repair and fabricate parts in any of the trade/technical areas. Welding fuels, gasses, electric current, electrodes, and their applications are introduced.

MFGT 121 Basic Welding II

Continuation of MFGT 120. This course covers basic horizontal and vertical welding using Oxy- Acetylene (OAW), Shielded Metal Arc Welding (SMAW) and Gas Metal Arc Welding (GMAW). Prerequisite: MFGT 120.

WELD 100 Orientation & Safety

This course is designed to give the student a broad overview of the various welding and machining processes as well as their applications and to develop safe working habits and become aware of safe working conditions in the Welding and Machine Trades.

WELD 101 OA Welding, Brazing, Cutting**WELD 102 Testing OA in Welding/Brazing****WELD 103 GMA & FCA Welding****WELD 104 SMA Welding I****WELD 105 SMA Welding II****WELD 106 GTA & PA Welding****WELD 108 Symbols for Welding Blueprints****WELD 109 Blueprint Reading and Welding Symbols**

Teaches students how to read and interpret structural steel, piping, and mechanical blueprint reading. The course will cover hand sketching of orthographic and isometric drawings, as well as interpreting weld symbols.

WELD 151 Welding Theory I

A course introducing the processes of Oxyacetylene Welding (OAW), Shielded Metal Arc Welding (SMAW), and Gas Metal Arc Welding (GMAW). Safety for the student and safe welding practices are emphasized. Welding and cutting equipment, selection of welding supplies, and metals used in industry are introduced. Welding symbols and their interpretations are stressed.

WELD 152 Welding Theory II

A study of welding symbols and blueprints, welding codes, specifications, and tests with special emphasis on AWS and ASME welder qualifications using guided

bend-tests. Oxyacetylene Cutting (OFC-A), Carbon Arc Cutting-Air (CAC-A), Gas Metal Arc Welding (GMAW), Shielded Metal Arc Welding (SMAW), Flux Cored Arc Welding (FACW), and Gas Tungsten Arc Welding (GTAW) are studied in more detail. Also covered are the effects of heating and cooling rates on steel and the techniques used to prevent weld cracking.

WELD 153 Welding Lab I

Beginning instructions on skills in Oxyacetylene Welding (OAW), Oxyacetylene cutting (OFC-A), Shielded Metal Arc Welding (SMAW) and Gas Metal Arc Welding (GMAW) using various thicknesses of steel, with a strong emphasis on safety handling welding and cutting equipment. Also covered are general safety, welding supplies, and equipment maintenance. Out of position OAW, SMAW, and GMAW are introduced.

WELD 154 Welding Lab II

Instruction will consist of perfecting skilled welding on plate steel in all positions using Shielded Metal Arc Welding (SMAW). Also covered are Flux Core Arc Welding (FCAW), Gas Tungsten Arc Welding (GTAW), Gas Metal Arc Welding (GMAW) (including the spray transfer process), weld testing and Carbon Arc Cutting-Air (CAC-A). Time is allocated for practice and welding plates for the American Welding Society (AWS) plate test. If time permits, the student may begin advanced welding.

WELD 201 Welding Theory III

This course provides the student with the technical understanding of uphill pipe welding nomenclature and procedures using Shielded Metal Arc Welding (SMAW). It provides training to develop welding skills necessary to make high quality welds on carbon steel pipe with open root and with backing rings according to AWS, ASME, and API Codes. Weldability of ferrous and non-ferrous metals, metal identification and welding codes/certification will be studied.

WELD 202 Welding Theory IV

This course provides the student with a technical understanding of pipe welding using Gas Tungsten Arc Welding (GTAW) for the root pass on carbon steel pipe and stainless-steel tubing according to ASME code. Pipe welding using Gas Metal Arc Welding (GMAW), and Shielded Metal Arc Welding (SMAW) vertical down techniques will be studied. Submerged Arc Welding (SAW), Welding Metallurgy, Plastic Welding and Maintenance Welding will be covered. A student portfolio will be made.

WELD 211 Welding Lab III

This course provides the practical skill to produce pipe welds on carbon steel pipe in all positions using E-6010 and E-7018 electrodes according to certification requirements of the American Society of Mechanical Engineers (ASME) code. Carbon steel plate (unlimited thickness) is welded using Flux Cored Arc Welding (FCAW) and Shielded Metal Arc Welding (SMAW) to American Welding Society (AWS) Code. Common carbon steel joints are welded using Gas Metal Arc Welding (GMAW). Students do repair and projection jobs.

WELD 212 Pipe/Plate Welding

This course provides the practical skill to produce welds on carbon steel pipe and stainless-steel tubing using Gas Tungsten Arc Welding (GTAW) for the root pass and Shielded Metal Arc Welding (SMAW) for the fill and cover passes according to certification requirements of the American Society of Mechanical Engineers (ASME) code. Pipe is also welded vertical down according to the American Petroleum Institute (API) code. Carbon steel plate (unlimited thickness) is welded using Flux Cored Arc Welding (FCAW) and Shielded Metal Arc Welding (SMAW) to American Welding Society (AWS) certification code. Common carbon steel, stainless steel, and aluminum joints are welded using Gas Tungsten Arc Welding (GTAW) and Gas Metal Arc Welding (GNWA). Submerged Arc Welding (SAW) is used. Hard surfacing, plastic welding, and cast-iron welding projects are done. Cutting processes used are Plasma Arc Cutting (PAC), Carbon Arc Cutting (CAC-C),

and Oxyacetylene cutting (OFW-A).

WELD 213 Fabrication Welding

This course provides skill to produce welds on carbon steel pipe using Gas Tungsten Arc Welding (GTAW) for the root pass and Shielded Metal Arc Welding (SMAW) for the fill and cover passes. Carbon steel plate (unlimited thickness) is welded using Flux Cored Arc Welding and Shielding Metal Arc Welding (SMAW) to American Welding Society (AWS) certification code. Fabrication projects will be made using Robotic Welding, Press Brake Forming, CNC Plasma Cutting, Shearing, and Punching. Fixtures will be designed and used. Submerged Arc Welding (SAW), Gas Tungsten Arc Welding (GTAW), Hard surfacing, Plastic Welding, Cast Iron Welding, Carbon Arc Cutting (CAC-C) and Oxyacetylene (OFW-A) will be used. Students in this lab will do 60% fabrication.